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Address.

THE HISTORY OF THE GROWTH OF THE ANTI-TUBERCULOSIS MOVEMENT IN MASSACHUSETTS, AND THE LESSONS TO BE LEARNED THEREFROM.*

BY VINCENT Y. BOWDITCH, M.D., BOSTON.

IN appearing before you today at the invitation of the founders of this school, I find myself rather at a loss in trying to voice the deep feeling natural to any one upon such an occasion as this. Gratitude to those who have thus honored me by placing me upon the list of those who are to appear in this, the first season of the school; reverence for the memory of the great and good man whose name it bears; a sense of sadness that the wonderful personality which we all loved and leaned upon for sympathy and guidance is now only a memory,—a memory, however, which must always be an inspiration for patient, strong, and unselfish endeavor to alleviate the suffering of others; finally, the earnest desire that I may say or do something worthy of such an occasion to help you from my own experience:—all these thoughts crowd upon me as I stand before you today in the midst of sacred associations which will ever be coupled with the names of Saranac Lake and Edward Livingston Trudeau.

I have been asked to give you the history of the growth of the tuberculosis movement in Massachusetts, and something of my own experience therein.

In tracing the first active steps taken in our state for the closer study of tuberculosis, it is inevitable that the treatment of the subject should partake of something of a personal nature. I trust that in recording certain facts, I may not be accused of too great filial zeal in mentioning the special work of my father, the late Dr. Henry Ingersoll Bowditch; and I hope, moreover, that I may not be thought egotistical if I bring before you some of my own experiences in these directions during the last twenty-five years while following out and enlarging the scope of certain ideas which were constantly advocated by my father.

Under the tutelage of the great Louis in Paris, in the early thirties of the past century, he imbibed the teachings of Laennec in stethoscopic examination of the heart and lungs. Returning to America, already deeply interested in diseases of the chest, he was pronounced by his contemporaries to be the fitting successor of the then famous Boston physician, Dr. James Jackson, in this special line of work. Early in the fifties, my father began to make laborious investigations, as to the causative factors of pulmonary tuberculosis; at that time existing under the less scientific name of "consumption."

Patient research through the various sections of the state by closely questioning the medical men in every direction, revealed the interesting and important fact that continued residence upon a damp soil was apparently, for some reason possibly not satisfactorily explained, a potent factor in the production of the disease.

* Delivered at a meeting of the Trudeau School of Tuberculosis, Saranac Lake, N. Y., June 21, 1916.

This work covered a period of eight years, and in 1862 he gave the result of his investigations to the Massachusetts Medical Society, the work being published at that time under the title of "Soil Moisture as a Cause of Consumption," etc. This work was received with acclamation by the Massachusetts Medical Society. A perusal of the pamphlet with its carefully prepared maps and other data convinces one of the immense amount of labor given to the work, and of the apparent soundness of the deductions drawn from his researches.

As an interesting coincidence, Dr. Buchanan of London, almost at the same time published the results of his investigations in England, with practically the same conclusions as those of my father, neither having had previously any knowledge of the other's work. This was twenty years before Koch gave to the world (in 1882) the discovery of the specific cause of tuberculosis: the *bacillus tuberculosis*. Although this discovery gave an unprecedented knowledge of the etiology of the disease, it in no way weakened the importance of the work previously done, for although our modern conception of tuberculosis has been greatly modified by the discovery of the bacillus, I think it may be justly said that clinically we recognize, or should recognize, the fact that although other factors may be equally favorable to the growth of the bacillus, like crowded, ill-ventilated workshops or houses, yet people who live in swampy, low-lying regions seem to be more prone to ill-health in various forms than those who reside on drier, more porous soil, regardless of mere elevation. That such conditions of previous ill-health should be one cause of lessened power of resistance to infection from tuberculosis seems, at least, a plausible explanation of the fact discovered simultaneously by two investigators. Possibly the true reason may never be proved, but we can certainly be guided by what experience has shown to be a clinical fact, and I bring this point up now because, with our present knowledge of specific causes of disease, we are apt to forget the valuable and trustworthy experiences of earlier times.

About the time of which I speak, at Görbersdorf in the mountains of Silesia, the famous Brehmer, who may be called the father of the modern sanatorium treatment for tuberculosis, was beginning to teach the good results upon patients of a properly regulated life in the open air: methods which were at that time ridiculed and condemned by most of the profession, which was steeped in theories involving ideas quite contrary to those taught by him. It is needless to dwell now upon his long and patient work, and the favorable results obtained by him, which have served as a model for succeeding generations and hosts of followers.

Whether at that time Brehmer's ideas had crossed the ocean to special individuals or not, it would be impossible to say today; but an interesting clinical fact which has but recently been brought vividly to my attention, makes it evident that at least one man, over sixty years ago, had prophesied that fresh-air treatment, carried out to a very marked degree, was destined to supplant the methods of that time when patients were shielded not only from cold but even from fresh air; coddled and protected at home; often sent to warm, relaxing climates, and dosed *ad nauseam* with cod-liver oil, whiskey, and other vaunted remedies.

Among my earliest recollections are my father's vehement protests against the close, confined atmosphere of sickrooms. Insistence upon removal of air-tight stoves as the arch enemy of good ventilation, the importance of open windows, of dry cellars, the cutting down of trees which shaded houses too heavily in the summer, and the avoidance of the excessive use of medicines, were all lessons imbibed early and unconsciously by me from their constant reiteration, although I do not recall the suggestion then of our more modern drastic methods, which at that time would have doubtless been regarded as little less than insane by most observers.

In a letter received recently from a gentleman over ninety years of age but still in vigorous health,— a patient who consulted my father in 1857 (nearly sixty years ago) because of incipient tuberculosis,—I have proof that the modern methods had at least entered my father's mind from whatever source. I will not apologize for offering you something of a distinctly personal nature. In my opinion, such examples furnish more vivid proof of the correctness of principles or ideas than pages of mere suggestions, and I should like to impart to you some of the pleasure and profit that I personally received from the words which I now quote, coming as they did unexpectedly.

March 8, 1916.

Vincent Y. Bowditch, M.D.,

My dear Sir:—In a conversation, last night, with your friend and classmate, Dr. X., I spoke of a distinct service your father rendered me in the late summer of 1857. After Dr. X. had heard some of my experiences in carrying out your father's directions and the results that followed, he asked me, "Did you ever write and thank him for that service?" I replied, "I did not think of it then, in my confusion, but I have often since, and I should greatly enjoy meeting a son of his and of telling him the happy result of that two hours' consultation, which was my perfect restoration to health in twelve months from well-defined tuberculosis."

Then Dr. X. told me of his pleasant relations with you, gave me your address, and I am greatly enjoying paying a debt, *long past due,* through you to your father's memory.

In that interview, your father strongly disapproved of my going to Key West, as I had proposed, and as strongly expressed his firm conviction that an "out-of-door life on a Minnesota ranch" would speedily bring relief from my ailment. I recall vividly the suppressed vigor with

which he said, "Avoid drugs, hotels, hot stoves, plastered rooms; you can get all these here in Boston and die; yet if you and your young wife have the pluck to go where and do as I tell you, you can live, and live in good health and in a community of immense promise." He walked with me to the door of his office, and patting me smartly on my shoulder said, "Do not fear this cold-air treatment; it is the coming cure for your trouble."

I went, and heartened under his compelling words, I proved his prediction true. Dr. X. seemed to enjoy my narrative of the many severe and cruel tests brought to me and my young wife and child in testing out that "outdoor cure" in a record-breaking Minnesota winter, but the great joy of a perfect recovery outmatched them all.

I can assure you your father's memory has been kept green through all these years. . .

Very sincerely,

Note the last remark made to the patient as he left the office. It has the interesting quality of prophecy in it to us now, surrounded as we are by the frequent proofs of the correctness of those who in recent years at least have believed in and seen the gratifying results obtained in thousands of cases from fresh-air treatment pushed to its limit, and who have felt the stimulus of hope as contrasted with the former heart-sickening sense of depression whenever the word "tuberculosis" or "consumption" happened to be mentioned to the unfortunate victim or to those dear to him.

This point should be emphasized strongly, for, in the midst of doubts and perplexities of practice at the present time, and with the often discouraging attempts to bring tuberculous patients back to health, it is well for those of the younger generation to know the utter hopelessness that often pervaded the minds of patients, their friends, and even the physicians themselves, before more modern methods were begun. I feel, now, grateful for my own experiences of former years, for it gives me the greater courage in speaking of the vastly improved methods of dealing with tuberculous patients of today, and I say this in the face of the statements of a few pessimists who decline to believe that the undoubted decrease in the mortality from tuberculosis has any connection with the modern methods of treatment and who are inclined to believe that our efforts are fruitless in that direction.

Just here, however, it would be well to speak of the necessity for conservatism in all enthusiasm for new projects and ideas. It was said of the great Pasteur that he was continually clipping the wings of his transcendent imagination lest it should lead him astray while lifting him to regions higher than before. He rigidly tested his conclusions before submitting them to final proofs and cautioned others to do the same, for he saw the danger of claiming too much lest discredit should fall upon an idea which, while marking a distinct advance, was possibly far from perfect.

The growth of the idea of sanatorium treatment for tuberculosis is a marked example of this. Its earliest advocates, who knew how much could be accomplished by it and who continually urged this method, knew perfectly well that it was not a panacea for every case, and continually urged conservatism even in their enthusiasm for it. Many over-zealous workers, however, among the profession and the laity, deceived by the favorable results, sometimes only temporarily obtained by sanatorium treatment, jumped at conclusions, and even rushed into print with extravagant claims in spite of the protests of those who knew better. The inevitable result followed: a reaction from unhealthy enthusiasm over a new idea and a corresponding swing of the pendulum to an equally extravagant degree in the other direction, with detriment and injury—fortunately, however, not permanent—to a cause which had been proven of great benefit to humanity.

Soberer judgment in recent years, however, has brought this subject back to a more normal point, and to those who know that tuberculosis, to be overcome, must be attacked by every method known to science, there is now no shadow of doubt that one of the most important of these is the establishment of sanatoria for suitable cases, where, under favorable conditions, thousands of patients may be restored to health who in former years would have run the usual fatal course, unaided and hopeless.

Trudeau, as most of you know, founded his now famous institution in 1885, as the first of its kind in America. Encouraged by his example, and having in mind the often expressed wish of my father in former years, that he had some place in the country near Boston where he could send tuberculous patients with benefit, I soon afterwards conceived the idea of establishing a small institution not far from my native city for this purpose, to be used for those who could not afford to seek distant health resorts. At that time, it was thought to be a *sine qua non* of recovery from tuberculosis that high altitudes far from the sea should be sought. The idea that it could be cured at a low altitude not far from the sea, and in the harsh inclement New England climate was regarded by many as little short of chimerical.

In spite of many discouragements, however, in 1889, money was obtained from interested people, and a small farm was bought in Sharon, Massachusetts, eighteen miles from Boston, situated on the watershed between Providence and Boston, only 250 feet above sea-level, on gravelly soil and abounding in pine woods. With a sufficient sum of money assured to begin with, a small but suitable building for eight women patients was erected and on February 9, 1891, just twenty-five years ago, the Sharon Sanatorium opened its doors as a semi-charitable institution, the first of its kind in New England, and up to that time the only one in existence for

this special purpose under the above-mentioned conditions of altitude and climate.

Begun largely as an experiment hitherto untried, facing the natural doubt in the minds of many of the medical profession and others as to its ultimate success, the work naturally involved close observation combined with keen anxiety as to the outcome. It was not long, however, before favorable results in a fairly large percentage of early cases began to impress those who doubted at first. By continued observation in after years and by improved methods of treatment, the favorable results increased in number, finally leaving no doubt as to the success of the experiment begun years before. Since 1891, the sanatorium has steadily increased its capacity, and in this twenty-fifth year of its existence its work will be enlarged and broadened by the establishment of a combined school and sanatorium for tuberculous children. As each year goes by and favorable reports still come from those who years ago left the sanatorium with apparently renewed health, the success of the experiment is shown more and more satisfactorily. The fact, moreover, that this and every other sanatorium of similar nature, if properly regulated, acts as a school of hygiene for the patients and through them to the communities in which they live, I believe to be the most important feature of such work; for in bringing our patients back to health, we also teach others through them how to keep well: a potent factor in the cause of preventive medicine and one often not sufficiently recognized in considerations of the subject.

Dr. Alfred Worcester, of Waltham, Massachusetts, who had watched the work at Sharon in its early years with keen interest, was appointed a trustee of a proposed new state hospital for advanced consumptives, afterwards opened at Rutland, Massachusetts. Largely through his influence and in consequence of the favorable results noted at Sharon, as stated in the first report of the Rutland institution, the purpose of the new hospital was changed to that of a sanatorium for the treatment of early and hopeful cases of tuberculosis. In October, 1898, this institution was opened: the first state sanatorium of this nature in the United States, and to which I had the privilege of being attending physician for the first eight years of its existence.

From this time on, the anti-tuberculosis movement seemed to go forward by leaps and strides, spreading over the country. In 1898, Dr. Charles Millet of Brockton, Massachusetts, began a series of experiments with what may be called the first examples of "home treatment" among poor people, most of them mill and factory operatives who were dependent upon their own efforts for support. His admirable work in teaching his poor patients to build small, open sleeping balconies at their homes, to be utilized at night, was really the beginning in substantial measure of similar, but more elaborate methods in later years under the supervision of Dr. Joseph H. Pratt in Boston, and afterward his able co-worker, Dr. Nathaniel K. Wood, both of whom have published the favorable results obtained from so-called "church classes for tuberculous patients" under the charge of the Emmanuel and Arlington Street churches respectively. In 1900, Dr. Millet established in his ancestral home in East Bridgewater a sanatorium for well-to-do patients, founded upon the same principles as those of its predecessors, and within the last decade, two private sanatoria for the more favored class of patients have been established at Rutland, Mass., by Drs. Bayard T. Crane and George N. Lapham.

In 1904 the first attempt was made for dispensary supervision of tuberculous patients in Boston at the Boston Dispensary, under the guidance of Dr. E. O. Otis. This was founded upon the principle first suggested by Dr. R. W. Philip, now Sir Robert W. Philip, of Edinburgh, and of Prof. Calmette of France, who first gave their methods to the medical world in the eighties. By these means, the plan of caring for tuberculous patients at their own homes, and in the out-patient departments, was established. This plan, which was adopted so successfully by Philip and Calmette, never was developed to a large extent here, however, until recent years. It has been greatly elaborated since the establishment of the Boston (Mattapan) Hospital for Consumptives, founded in 1906, with its large out-patient clinic, situated in the heart of Boston and under the central control of the municipal authorities and the medical staff. Not long after the establishment and growing success of the Rutland institution, it was my strong personal conviction, and that of others, that in order to work towards the greater control of tuberculosis, hospitals for the more advanced cases must be erected throughout the state, and a strong sentiment arose in favor of the plan. Public interest had been steadily aroused, and, in 1907, nine years after the opening of the Rutland sanatorium, the erection of the large hospitals, now at North Reading, Lakeville, and Westfield, was authorized by our legislature. At first, these partook, as intended, of the nature of hospitals for very ill patients, but with the steady growth of the anti-tuberculosis movement and the realization that towns and cities should erect their own local hospitals for such cases, the character of these last-mentioned institutions has recently changed again, the object being to devote them to the more hopeful cases. The sanatorium at Westfield is now being used chiefly for women and children.

In 1907, the Prison Camp at Rutland, for the reception of tuberculous inmates of Massachusetts prisons, was founded.

The Boston Association for the Study and Prevention of Tuberculosis, founded in 1903, was another proof of growing public interest.

Composed of physicians and laymen, its example has been followed in many places throughout the state. It was instrumental in founding a "Day Camp," the "Prendergast Camp" in the suburbs of Boston, and also the second school in the country for tuberculous children, as well as other important features in anti-tuberculosis work.

During the past three years, the Massachusetts Anti-Tuberculosis League, an outgrowth of the original Boston society, was begun. The object of this latter association is to bring together the various anti-tuberculosis societies at stated periods, to compare conditions and results of work, thus encouraging coöperation of the various societies which are actively working throughout the state, and to spread by individual effort in special communities knowledge of the disease and the means of overcoming it.

The movement in Massachusetts has received a great impetus in the past three years by the establishment of a Board of Health Commissioners, which has replaced the former State Board of Health. Under the guidance of the chairman of the Board, Dr. Allan J. McLaughlin, strong influence has already been brought to bear toward enforcing laws relating to the tuberculosis question, notably those which compel any town of 10,000 or more inhabitants to establish dispensaries, and every city of 50,000 or more to build hospitals for the reception of far-advanced cases, thus doing away with the necessity of taking such patients far from their homes and friends, and at the same time removing sources of infection from the crowded and poor districts. The more recent law for the erection of county hospitals in communities of under 50,000 inhabitants, at the rate of one bed to each two deaths, is also being enforced.

At the present time, ten of the twelve cities in Massachusetts of 50,000 inhabitants or over have hospitals for advanced cases, some being under private management; four cities of under 50,000 have hospitals; and there is one county hospital in Hampshire and another already authorized for Barnstable County.

Fifty-four of the cities and towns of 10,000 inhabitants or over have now dispensaries established. Mention must be made also of the erection of separate wards or buildings for the tuberculous insane.

The Commissioners of Health are also endeavoring to bring about a more rigid enforcement of the law requiring physicians to register their cases of tuberculosis; and during the past winter the first attempt has been made, thus far unsuccessfully, to pass a law for the control of the incorrigible consumptive.

In reviewing what has been done in these matters in the last few years, when grappling with one of the most difficult problems known, one can feel only the greatest satisfaction, coupled with the belief that, with time and inexhaustible patience and persistency, tuberculosis can be relegated not only to the list of diseases under control, but to the list of those which are preventable. This cannot be done, however, without the active co-operation of every physician in following out closely the teachings of past years. There has been surprising and discouraging apathy and indifference up to comparatively recent times in these matters; hasty and careless diagnoses; neglect in watching symptoms which are known now to be strongly suggestive of tuberculosis, even when active signs may not be present; failure to make sputum examinations and to report cases of tuberculosis to health boards; lack of care in teaching the patients and their families the danger of infection and how it may be avoided, at the same time warning them against the wrong and harmful spirit of terrorism. All these shortcomings retard the successful outcome of the tremendous efforts now being made far and wide to lessen the ravages of this disease.

It is an encouraging thought, however, to mark, apart from what is being done in Massachusetts, the gradual change of feeling in these matters everywhere, and especially inspiring to note the enthusiasm with which this new movement at Saranac Lake has been met. The quick response to the announcements of this school should bring courage and hope to all of those who are deeply interested in it. It is you who can now act as missionaries in this great movement throughout the communities in which you live, not only in the profession but among the laity.

In the foregoing remarks, I have endeavored to give you some idea, although necessarily an imperfect one, of what has been done in my own state. With each month that passes, some new work is begun, and at the close of each year all that has been accomplished serves to make the previous record seem like ancient history. It all proves, however, the fact of the strong determination that is already increasing among our people to overcome the disease which causes the largest death rate in the civilized world.

Only by absolute patience, by dogged perseverance, with our present knowledge of the disease and its remedy, can we make progress. Let us not be deceived by the belief that the end can be gained in any given number of years. The experience of those who have been working in the State of Victoria in Australia, as told us by Dr. Victor G. Heiser (our former Health Commissioner in the Philippines) in an address last year, should give us courage to feel that possibly we can do likewise even though our social conditions may make the task more difficult than in countries where they may be less complicated than here. The results claimed by them, as testified to by Dr. Heiser in the *Journal of the Out Door Life* of January, 1916, should be read by everyone, for they contain details of procedure which must be faced in our own country if we hope to gain the success claimed

in Victoria. Chief among these details comes the registration of every case of tuberculosis by the health authorities, which involves absolute adherence to the law which now exists with us (but is not obeyed as it should be), viz., that every physician shall report to the local board of health and to the state health commission all cases of tuberculosis. Another item, already mentioned, is the care and control of the incorrigible consumptive who, regardless of laws, of his own health and that of others, persists in spitting indiscriminately everywhere and indulges otherwise in filthy habits. Our people have not yet been brought to the pitch of insisting that such laws shall be enacted; laws which, while somewhat drastic, can be made consistent with kindness and justice to the individual, and to the community. Four states in the Union, viz., New Jersey, New York, Wisconsin, and Minnesota, have made laws for this purpose, which vary in their scope. How thoroughly these laws are being enforced, however, is a matter of doubt.

The attempt made last winter to pass such a law in our Massachusetts legislature failed, as expected, because of lack of proper knowledge of the subject among not only the legislators themselves but the people they represent. Here is another of the many details of missionary work in which we all as intelligent physicians should take part.

A knowledge of the history of medicine is of great importance to every student, that he may learn through the experience of others facts which shall make him better prepared for the practice of his profession in whatever branch he may have chosen. Having given you a very brief history of the growth of the anti-tuberculosis movement, I trust it may be helpful to you if I now give you something of my personal experience in this branch of medicine, covering a period of over twenty-five years. One learns, after years of practice in methods of treatment, that a judicious amount of scepticism to temper the earlier enthusiasm is always best, provided that one, while having a reasonable hesitation in accepting new ideas immediately, does not fall into an attitude of conservatism which may blind him to the merits of what is new and possibly useful.

I have been long enough in practice to witness the rise and fall of many a vaunted remedy for tuberculosis. Most of them have had their day only to be put, rightly, into oblivion. Some of them have had a certain amount of merit, "the grain of wheat in a bushel of chaff," and may be utilized as such. While still holding to the hope that we yet shall discover some specific remedy for this disease as in others, that may lessen its ravages, I find that thus far what we call the hygienic care of the patients is the chief factor in all treatment, such as is now made use of in all properly regulated sanatoria: fresh air pushed to its limit, the judicious use of rest and exercise, proper diet, and close observation of the patient during the active stage of the disease.

Serums, inhalations, injections (both rectal and subcutaneous), even drugs, have been tried many times, only to fall into disuse, though a few of them have proved useful as adjuncts to other treatment. After a long-extended conservatism, however, as to the wisdom of its use, I have come, after careful observation of patients who had seemed to resist the ordinary methods of treatment, to the position held by Trudeau: that in selected cases the cautious use of tuberculin is not only beneficial and lessens the liability to relapse, but that it is often followed by complete arrest of the disease as shown by subsequent histories. That it should not be used indiscriminately, and should always be under close supervision, is my firm opinion. I cannot recall any case in which I could trace harm to the patient from its careful use, although in some it has been discontinued because of some possible discomfort or failure to note special improvement after several weeks of trial. The forms employed at Sharon are those either of the old tuberculin or the "bouillon filtré" of Dénys.

As to the use of artificial pneumothorax, our experience at Sharon would seem to show quite marked improvement, occasionally surprising, in certain cases of fairly-well-advanced disease when ordinary measures had failed to produce marked results. This has not been always the case, however, and whether this method of treatment will be as frequently resorted to in the future as some of its advocates prophesy, we feel to be, in the present stage of its development, a matter of doubt.

Let me now give you something of my own personal experience in determining the presence of tubercular disease in its pulmonary form. The day of hasty diagnosis in any suspected case is past and there can be no excuse for the lack of proper and thorough examination of the patient when suspicious symptoms are present. Of paramount importance is the previous personal history of the patient, which often throws a flood of light upon conditions which may be shrouded in doubt. Given a history of malaise for several weeks or months, loss of flesh, possibly slight feverishness, accompanied or not by cough, *watch your patient* carefully and examine his chest from time to time and note if there are any departures from the normal there. Cough is, of course, a suspicious symptom, and if sputum appears it should be examined immediately, keeping the established fact in mind that repeated negative examinations do not prove the absence of tuberculosis. If, upon percussion of the chest, you find a difference of pitch in the apices, or even slight dulness, ***note the fact*** and watch your patient, while keeping in mind the normal difference often found in healthy individuals in the apices of the lungs.

If there is a difference in the character of the respiration in the two lungs, or a single râle at one or the other of the apices, be still more suspicious of incipient trouble. Modern science and observation have taught us that pathological conditions other than tuberculosis can cause, possibly, apical changes, but the weight of evidence is in favor of regarding such conditions as danger signals which must not be disregarded. Personally, in accordance with my earliest teaching, I have found that such signs, coupled with systemic symptoms of fairly long duration, are, in the majority of cases, significant of early pulmonary tuberculosis, as proved by subsequent histories.

As to haemoptysis, the weight of evidence by most observers seems to show that in the great majority of cases it is a signal of incipient tubercular disease, even when physical signs are lacking; to which opinion I agree, but from long observation I regard the appearance of blood as less grave, as far as prognosis is concerned, than other symptoms more significant of active systemic disturbance. To determine the exact causes of abnormalities in the lungs, with an accompanying enfeebled condition of the patient, often taxes the power of the observer to the utmost, and even the most skilled clinician may in some cases be unable to make a definite diagnosis. To lay down absolute laws, moreover, in teaching others how we have reached our own conclusions in a difficult case, may be next to impossible.

I shrink from making excursions into the realm of mysticism, but I believe that there often comes after long experience an intuition or instinct, by whatever term we may call that sense of conviction which we cannot put into words or possibly explain to others, but which helps us to reach our conclusions,—a dangerous faculty to depend upon too much, but which I think we must confess exists to a greater or less extent in every physician of long experience in his dealings with disease.

The use of the x-ray has of late years come markedly to the fore in examinations of the chest. With all the enthusiasm that is natural to a new and fascinating study, there is no one method which should be treated, in my opinion, with more conservatism than this. It is gratifying to notice this spirit among those who are experts in roentgenology; for, while thinking it to be a valuable adjunct in the diagnosis of disease of the chest, I believe the errors arising from its use by one of slight experience are too great to warrant its being resorted to by tyros as a certain means of diagnosis. That further developments may show it to be of even greater value than now is quite possible, but on no condition should it be considered the one determining factor as to the presence or absence of pulmonary tuberculosis. More than one striking example of hasty diagnosis on the x-ray alone, involving serious mental distress to patients who have presented no general symptom of pulmonary disease, has been brought to my attention,—a fact which makes me emphatic in my disapproval of conclusions based on this method alone.

Notwithstanding the fact that we have made a marked advance in the past few years as far as the successful treatment of tuberculosis is concerned, we have even a greater work before us in the field of preventive medicine. We are coming more and more to the belief that tuberculosis is a disease of childhood, which often lies latent, unsuspected until adult life, and then bursts into activity because of some acute exciting cause. It behooves us, therefore, to begin early to fortify children against disease by increasing their powers of resistance in every way possible. Pure milk, the adoption more and more widely of open-air schools even for well children, are among the most important factors in guarding against the development of tuberculosis. Proper housing, as a contrast to conditions often found (not alone in our poorer districts), thorough ventilation, and cleanliness in all workshops and factories, are equally essential and must be insisted upon if we wish to eradicate this disease.

As a concrete instance of the value of sanatorium instruction in the line of preventive medicine let me cite one case which bears directly upon this point. Not many weeks ago a woman who graduated from the Sharon Sanatorium thirteen years ago, and has been a most loyal friend ever since to the institution, came to my office to tell me of her subsequent history of good health and active work as a public school teacher in one of the largest manufacturing cities in Massachusetts. Sixteen years previously she had come to Sharon to remain as a patient for three years, frequently a source of despair to us because of repeated appearances of tuberculosis in varied forms. By persistent effort she finally regained her health and left with the disease completely arrested, and began again her duties as teacher and has continued them with scarcely an interruption since. Not long ago she wrote me—"I am better than ever before, and I lose no opportunity of teaching my children what I learned while at Sharon, the value of fresh air. During the past winter I have had the windows of my school-room almost continually open, and I have not had one child away from school during the season on account of illness, as against epidemics of 'colds' among the children of most of the other public schools in this town."

This is but one of the many striking examples of what can be done in the way of missionary work by those who have fought the disease themselves. Such testimony as this should give us hope and courage for the future.

In conclusion I linger over the memories of him whose name this school bears, and I obey the strong impluse to tell you the thoughts which come to me whenever I recall the life and work

of the beloved leader, master and friend now gone. We are passing through a terrible crisis in the history of the world. Every day brings to us some horrible tale of blood and carnage. Thousands of gallant young lives are daily being sacrificed; tales of noble, unselfish heroism are told over and over again, and emphasis is laid upon the wonderful latent attributes of human nature that are brought out in the midst of the horrors of war. All honor to those who thus give their lives to an ideal! But let us not forget the great army of those who, with no thought of personal glory, go bravely forth each day through months and years of patient, strong endurance, facing death by disease with cheer in their hearts and a smile on their lips. There are thousands of moral heroes too who brave the harsh criticism of the world while suffering mental anguish unknown to most of their fellow men, and who cheerfully endure for the sake of their ideal. Greatly as I honor the "heroes of war," my sense of reverence for the "heroes of peace" is even greater. Of such was Edward Livingston Trudeau. Always to be associated with the memory of him, come vividly to my mind the beautiful lines of a modern poet who, had he written nothing else, would yet be entitled to high rank among makers of verse.

"A picket frozen on duty,
A mother starved for her brood,
Socrates drinking the hemlock,
And Jesus on the rood;
And millions who humble and nameless
The straight hard pathway plod—
Some call it Consecration
And others call it God."

Original Articles.

SHOCK AT THE FRONT.

BY W. T. PORTER, M.D., BOSTON.

(From the Laboratory of Comparative Physiology at the Harvard Medical School.)

I.

IN July, 1916, I received a letter from the Rockefeller Institute for Medical Research asking me to go to "the front" in France or Belgium, in the hope that studies upon freshly-wounded soldiers might advance our knowledge of traumatic shock and lead to its prevention or cure. Dr. Carrel had written from Compiègne that many thousands died from traumatic shock and that a remedy was urgently needed.

I reached Paris July 20, and, after the usual delays in obtaining a permit for the Army Zone, I proceeded to the wonderful hospital at Compiègne—a hospital in which suppuration, hitherto sadly invincible and in war almost universal, has once for all been conquered. In this place, the genius of Carrel and of Dakin, and the penetrating intelligence of Compte Du Nouy have added a very glorious chapter to our knowledge. From Compiègne I went to La Panne in Belgium. Here, forty minutes from the trenches, Dr. De Page, a rare administrator and most able surgeon, has created an "ambulance" of 600 beds, perhaps the best of all the large hospitals near the fighting line. Through Dr. De Page, I became the friend of General P. and Colonel D., of the ——— brigade of French infantry, who invited me to visit them at Nieuport, where they were holding the sector along the river Yser. Here I remained some time, making observations in the trenches and in the postes de secours. Upon returning to La Panne, I was on duty in the receiving ward. The blood pressure was examined in all the wounded brought in during sixteen days and nights. Further observations were secured at Verdun and on the Somme.

Very early in this investigation, it was evident that my immediate duty was to study low blood pressures, from their onset until the death or recovery of the wounded. Two very practical questions were to be answered: Are the phenomena of low blood pressure in wounded men essentially those observed experimentally in laboratory animals? If so, can the lives of the wounded with low blood pressure be saved by the remedies which save the lives of animals with experimental shock? Obviously the first step was to determine whether life in the trenches, under bombardment, of itself lowers the arterial pressure or predisposes the soldier to a failure of the pressure after he is wounded. It was for this that I went to Nieuport.

Nieuport lies upon the Yser. When war broke out, the town contained about 4,000 inhabitants. Not one remains. Its handsome church, its historic tower, are totally destroyed. Nor has a single house escaped. Every day, shells fall in its streets, and crumbling walls crash down, adding fresh ruin to a scene most desolate. The town and the trenches on the opposite bank of the Yser are held by some thousands of French soldiers. Naturally, everyone lives in a cave; in the town, a cellar made proof against all but heavy shells; in the trenches, a hole dug in the earth.

By day, the streets are almost deserted. With the dark, the scene changes; the streets fill with men; horses and carts appear; and every man and every cart carries a burden; beams, baskets, ammunition, bags of chloride of lime, wicker supports for the sides of the trenches, cement, and a hundred other articles. Meanwhile, the bombardment goes on. Even when the communiqué reports "perfectly calm," there are in each regiment at least five or six wounded every twenty-four hours. It seems a small loss in a regiment of 2,500; yet this never-ceasing drain is even more important than the

spectacular "offensive." Five or six men a day is 2,000 men a year. No man can foretell when his turn may come. In fine weather, the Colonel, three officers, and myself, used to lunch and dine in one corner of a ruined court. In the course of ten days, two shells fell in that court, both at the end containing the cook-stove. At that end not a square foot escaped its piece of broken steel. But the stove was in a small recess, and the chef was near the stove. His deserts were great and he escaped uninjured. Such accidents happened everywhere in Nieuport. In the trenches, naturally, it was worse. There should have been a constant strain. It was, therefore, with the greatest interest that I undertook a study of the blood pressure under these novel conditions.

These studies began at the place most likely to yield a result, namely, in the first line trench, 38 metres from the Germans. It was a strong work, heavily reinforced with sandbags and well provided with machine guns. Through a periscope, the German line seemed strangely near. Absolutely silent, except for shell fire, it stretched across the unkempt fields as far as the eye could reach. Deserted though it seemed, to lift a head above a parapet was almost always fatal. The soldiers who held our trench were very cheerful. They bared their arms and watched the record of the blood pressure with smiles. Except that everyone spoke in a low tone and kept well against the front wall of the trench, we might have been in Paris. The arterial pressures were normal. Half an hour afterwards, an officer in that trench was shot through the head.

I made a careful study of the men under all the conditions of their apparently abnormal life, in the trenches, the batteries, the observation towers, and in their sleeping quarters. The food was good. The coffee and soup were hot even in the first line. The bread was excellent. I went to the company kitchens and fished the meat out of a kettle in which was cooking the stew for 200 men. It was all that could be desired. The latrines, which furnish an admirable index of military efficiency, were beyond criticism, even in the trenches. I went into every latrine to be found within a square mile; they were all well limed and inoffensive. The sleeping quarters, to be sure, were dark and often damp. Poor Colonel D. kept a stove going day and night near his bed and even then his cave was wet. Yet in this whole regiment, there were practically no sick. At first, I could not believe this. But as I slept with the regimental surgeon, in a black hole under a fallen brewery, the health reports were soon at my disposal. The official health return was convincing evidence. This amazing efficiency was due to the good food, the wonderful *esprit* of the officers, and the fact that the regiment was kept in Nieuport for periods of eight days, after which the men were rested an equal period at Ost Dunkirque, where they could live above ground, though still exposed to occasional shell fire.

It is important not to judge a soldier from the standpoint of a civilian. Life at Nieuport is just as normal as life in Boston. It is different, to be sure, but well-fed men commanded by trusted officers speedily accustom themselves to the difference. Near the cellar in which I slept was a small garden, pleasantly decayed. I used to sit here under a pear tree, reading, while the Germans tried to find an annoying battery of "seventy-fives" two or three hundred yards away. Shells flew overhead sometimes at the rate of four or five a minute, but no one minded them. It was perhaps dangerous, but not very dangerous, and it was as safe there as anywhere else. The point to be made is that being under fire soon gets to be a matter of course. There is nothing in this to affect even the heart beat, much less the more stable arterial pressure.

My observations, therefore, do not support the view that soldiers under fire suffer from low arterial pressure.

The artillery fire preceding and during an attack is, of course, much more severe than the habitual bombardment. To get blood pressures during an attack, I went to Verdun, where my post was a wretched cellar at the Mort d'Homme. More than 20,000 wounded had passed through that cellar—a wet, dirty, black, verminous hole, in which one could scarcely stand upright. But at the time of my visit there was no offensive; the re-capture of Douaumont was some weeks later. After Verdun, I asked to be placed in a column of attack at the Somme. My application was backed by the highest civil authority in France, but "Grand General Headquarters" would not hear of a neutral mixing in that business. Here I got no nearer than a clear view of the aeroplanes, the sausages (stationary balloons) and the smoke of the guns. Close questioning of the officers of the Nieuport regiment, which had been in the worst of the great German drive against Verdun, made it clear that a storm of eight-inch shells is not an indifferent matter. There is some emotion. It is possible that such emotions may affect the heart beat, but there is at present no evidence and no probability that the blood pressure is materially lowered. Indeed, we are led to expect that the excitement would raise the blood pressure rather than lower it.

The air pressure from the explosion of large shells sometimes shakes the nerve cells so violently that their functions are, so to speak, shaken out of them. Paralysis, low blood pressures, and other injuries may be thus produced in men who have no visible wound. The treatment of these low-blood pressures does not differ from the treatment of those following wounds, but the prognosis is probably less favorable.

Experiments made with Dr. Story (Porter, W. T., and Story, T. A., *American Journal of Physiology*, 1907, xviii, p. 184) in 1906 showed that when an animal received a blow on the skull, the general blood pressure fell to 33 mm., but soon rose again to the normal. Thirty millimetres is the level to which the pressure sinks on removal of the spinal cord. Similar effects are seen in soldiers from the air pressure of exploding shells. In Amiens, I examined cases in which the low blood pressure had continued several days but with ultimate recovery.

Serious injury is also produced by the inhalation of the hot gases liberated by the explosion,* but I have no data as to the effect of such gases on the blood pressure.

The usual history of a wounded man with low-blood pressure may be learned from one of the cases which fell under my own observaiton. A shell explodes in a first-line trench. The fragments tear the thigh, breaking the femur; the arm is also wounded, and some small pieces of steel enter the back here and there. The brancardiers (stretcher-bearers) quickly arrive, the man is placed on the stretcher, and borne to the poste de secours. As the first line is a mile from the poste and the trenches are narrow, progress is difficult, especially when the stretcher meets great cans of hot food slung from a pole resting on the shoulders of two men. At the poste, the wounded man is carried down some steps into a cellar, his wound is covered with a bandage, and he receives an injection against tetanus. Meanwhile the ambulance has appeared. The stretcher is placed on the rack in the ambulance, and I am placed at full length on another stretcher alongside the wounded man. The ride to the nearest temporary hospital begins. The road is rough, especially where it has been pitted with shell fragments. I find the jolting painful, but the wounded man is too far gone to groan. Our feet are next the curtain which attempts to close the rear end of the ambulance. A cold draught chills them. I reflect that as the patient is on the verge, this additional exposure may finish him. After almost an hour, the ambulance runs over cobblestones, even rougher than the country road, and we reach the *Pavillon de Réception.* A cry of "blessé" is heard. Brancardiers run out, the wounded man is carried into a large ward and laid on the floor. Orderlies appear with one large bag for his clothes and one small bag for articles from his pockets. He is placed on a bed, largely stripped, and washed. After a few minutes the surgeon appears. He finds the man with eyes turned up until only the whites are visible, the skin cold, the face muddy parchment, the heart frequent and feeble, almost no pulse at the wrist. Hot bottles are put in the bed. An intravenous injection is ordered. An ice-cold flask containing 1000 cc. normal saline solution is put in a pan of hot water. When the nurse thinks the saline should be warm, the whole quantity is pumped with a two-bulb syringe into a vein at the elbow. An hour is allowed to pass, so that the patient may be warmed and the saline solution may take effect. He is then lifted onto a stretcher, carried to a chilly operating room, placed almost naked on a cold table, chloroformed, his wounds widely opened—to prevent gas gangrene—and the bleeding vessels tied. Returned to his bed, a friendly nurse puts several pillows under his head and shoulders, and his body sinks comfortably down on the springs, so that his feet and legs are also higher than the abdomen. He is surrounded with hot bottles and often receives a stimulating hypodermic. After this, he takes his chances.

This is a typical case and it explains perfectly why so many men die from low blood pressure.

* Personal communication from Professor Richet.

II.

My observations upon low blood pressures are set forth in a brief statement drawn up at the request of Professor Richet and presented by him to the French Academy of Sciences, October 30, 1916. This statement is as follows:

The number of wounded who suffer from low arterial pressure is very large, much larger than most surgeons believe. The greater part of these wounded can be saved.

I have studied low arterial pressures in my laboratory and at the front.

My observations upon animals show that: (1.) When the diastolic pressure remains some time at from 45 to 50 mm., it will not recover without aid. Unless the proper remedies are employed, the animal dies of shock. A diastolic pressure of 50 mm. is therefore "critical." (2) When the diastolic pressure falls to 50 mm., the blood accumulates in the abdomen. This is a fact of the first importance. The animal bleeds to death in his own portal veins.

My observations upon wounded men at the front demonstrate: (1) That there is no essential difference between the low blood pressure of man and that of other animals. (2) The remedies that are successful against low blood pressure in animals are also successful against low blood pressure in human beings.

These remedies are: (1) gravitation; (2) the raising of the blood pressure by the injection of normal saline solution; (3) the raising of the blood pressure by adrenalin.

On coming from the ambulance, the wounded with low blood pressure should be placed immediately upon a special operation table (Fig. 1) heated by electricity. When an operation becomes necessary, the table is rolled into the operating room. The feet of the patient must be kept 30 cm. higher than the head, so that the abdomen may be higher than the heart and

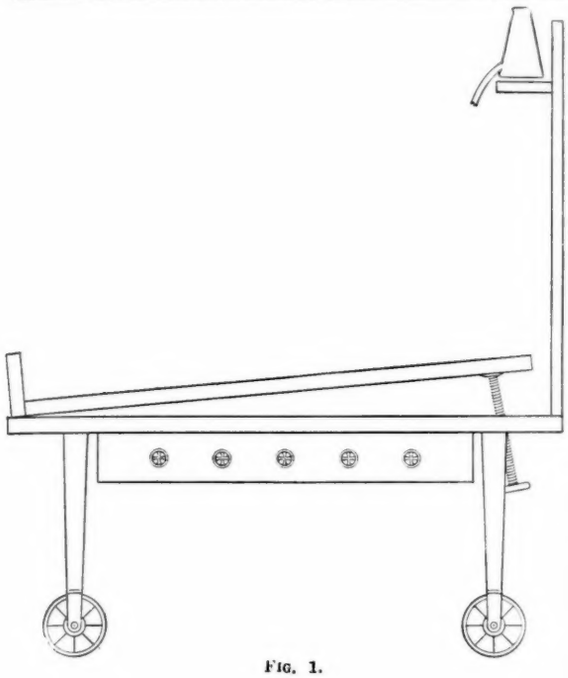

FIG. 1.

brain. The patient must stay upon the table until the diastolic pressure will remain almost or quite at the normal level.

The treatment by the inclined position requires time—an hour or more. If the patient's state is grave, he might die before gravitation produces its effect. In such a case, it is necessary to raise the diastolic pressure immediately from 20 to 30 mm. above the critical point.

If, therefore, the diastolic pressure is less than 80 mm., normal saline solution should be injected into a vein. The injection should be slowly made, and it should stop when the diastolic pressure reaches 80 mm. If the pressure falls again, adrenalin should be injected into a vein, preferably near the malleolus. The object of these injections is to keep the pressure above the danger point until gravitation is able to maintain the pressure at a safe level.

Occasionally there are cases too low for immediate operation and in whom death is threatened from slight but persistent hemorrhage. Normal saline injections or adrenalin would increase the hemorrhage by increasing the blood pressure. Such cases demand the transfusion of blood. Some of the blood transfused will be lost by the hemorrhage, but enough may be retained to bring the patient to the point at which the vessels may be tied and the usual treatment for shock instituted. Since donors object to arterial transfusion, because of the operation and the scar, arrangements should be made for withdrawing the donor's blood from a vein into paraffined tubes.

Finally, there are perforating wounds of the chest, in which the inclined position threatens asphyxia, while if the patient sits up, he may die of shock. For such cases, there is no present remedy.

The application of the general principles just stated to the routine work of a military hospital demands more detailed instructions. At the close of the work at La Panne, my report to Dr. De Page on the systematic treatment of low blood pressures was issued by him to the staff (Note No. xxviii, *Sur le traitement du shock chirurgicale,* Sept. 11, 1916), and it may serve here as an example of the necessary instructions. I quote only those parts of Note XXVIII which may complete the data given above.

From a practical standpoint, shock exists when the diastolic pressure is 60 mm. or less. The blood then accumulates in the portal veins, the activity of the heart is impaired, and the nutrition of the nerve cells is affected. The treatment of shock requires:

1. A special position of the wounded; the abdominal vessels should be higher than the heart and the brain.
2. Heat.
3. Intravenous injections of normal saline solution.
4. Intravenous injections of adrenalin.
5. The transfusion of blood, in certain cases.
6. The taking of the diastolic pressure every half hour.

1. *Position*: The patient should be placed at once on the special bed,* to be found in the Receiving Ward. This bed is of the following description: (a) the central part is of a size identical with a surgical operating table. (b) The removable side pieces increase the width to that of the ordinary hospital bed. The patient must not be taken from this bed as long as the arterial pressure is too low. (c) The foot of the bed must be raised 30 cm. The pillow must not be more than 6 cm. high. (d) The bed is heated electrically from below. (e) When the side pieces are lifted off, the bed is transformed into an operating table. (f) A stand 1.5 metres above the patient supports a bottle of normal saline solution, kept at 39° C. by an electric heater.

2. *Heat:* The heat should be continued until the feet and hands of the patient are warm. The heat should then be turned off at least for a time.

3. *Injections.* (a) When the diastolic pressure is below 80 mm., normal saline solution† should be injected into a vein. The fluid must be at 38°C. when it enters the vein. About 500 cc. may be injected, but it is not desirable to continue the injection after the diastolic pressure has reached 80 mm. The injection should be slowly made, lasting about 10 minutes. (b) If the pressure falls some time after the first injection is given, a second injection‡ of normal saline should be made. The quantity should

* This bed was finished at La Panne about Sept. 10, 1916.

† At La Panne, Locke's liquid was used. It contained NaCl 0.9, $CaCl_2$ 0.024, $NaHCO_3$ 0.02, glucose 0.02, water 100.

‡ It is recommended by Professor Nolf that this second injection contain 1 gram calcium chloride to each 1000 cc. of normal saline solution.

again be 500 cc. provided a diastolic pressure of 80 mm. is not reached with less, and the injection should occupy about 10 minutes. (c) If the pressure falls below 80 mm. after the second injection, adrenalin should be injected into another vein. The adrenalin, in a solution of 1:1000, should be kept in a stoppered flask in the dark. Solutions not colorless should be rejected. At the moment of injection, mix 0.5 cc. of the adrenalin solution in 50 cc. of normal saline solution, at 38°. The injection should be made very slowly, and should be suspended if the heart becomes irregular.

4. *The transfusion of blood.* The indications for transfusion have been mentioned above.

5. *Measurements of the blood pressure.* The diastolic arterial pressure must be recorded at least every half hour. It is especially upon the diastolic pressure that the nutrition of the nerve cells depends. Since the heart-beat in low blood pressures becomes frequent and feeble, the systolic pressure is relatively more affected than the diastolic, and is therefore a less reliable guide.

I can myself bear witness that at La Panne the practical results of these procedures were most gratifying. Dr. Carrel tells me that the method has been found very valuable at Compiègne.

In every serious wound, it is most important that the diastolic pressure should be recorded at the earliest moment. With the auscultatory method, I have often made this measurement in two minutes. The longer a low arterial pressure continues, the more difficult the recovery. Yet very desperate cases may be saved. At La Panne, men who looked like a cadaver, and were almost pulseless, came back to life, and after two hours talked pleasantly of their children.

FAILING CARDIAC COMPENSATION DURING PREGNANCY.

BY CHARLES H. LAWRENCE, M.D., BOSTON,

Assistant in Medicine, Harvard Medical School; Assistant Visiting Physician, Robert Bent Brigham Hospital, Boston.

IT is not the purpose of this paper to discuss the general subject of heart disease and pregnancy, nor to raise the question of the advisability of patients with cardiac disease becoming pregnant. So much has already been written upon these topics that there is now a definite basis for agreement, or disagreement, among obstetricians and internists concerning the influence of one condition upon the other.

Most of the data, however, have been collected in large lying-in clinics, and apply more correctly to the class of patients attending such clinics than to those met in private practice. Moreover, the evidence is largely concerned with the mortality statistics of women with heart disease who become pregnant, and presents but meagre description of the factors which were potent in causing the results thus tabulated.

Face to face with the question of advising an individual not to have children on account of her cardiac condition, or that pregnancy be terminated before the period of viability for the same reason, statistics furnish a sound basis for general statements, but are disappointing as an aid to definite decision in any given case. Each problem is an individual one, and save in the very slight or very marked cases of cardiac disease, statistics are of value only in so far as the physician is able to place the patient in the proper classification afforded by tabulated evidence, and then correctly to judge the given heart as able or unable to meet the demands of pregnancy and labor. The risk lies in our ability so to judge. For though, as Stengel and Stanton have shown, pregnancy does not cause cardiac hypertrophy, and only a moderate dilatation of the right ventricle during the latter months, it *may* be the indirect cause of a greatly increased demand upon the heart through its common effects such as distention and insomnia, through its complications such as pyelitis or toxaemia, or through its termination by prolonged or difficult delivery. Therefore in estimating the ability of any heart to meet the possible demands of pregnancy, the margin of safety demanded must be a wide one and the estimation of cardiac compensation and reserve must be based upon thorough and painstaking examination of the circulatory apparatus, and upon the understanding that the patient must be very closely watched during pregnancy and labor for signs of failing compensation.

The classical signs of failing heart, dyspnoea, edema, and tachycardia, often appear too late to be of use in avoiding catastrophe, or give no warning of the acute dilatation which cuts short what is apparently normal life for the patient. Therefore, if patients with cardiac lesions are to be carried through pregnancy successfully, we must learn to recognize, and make use of, the minor signs of failing compensation.

What are these signs, and are they of any value in detecting diminishing efficiency of the circulation? Various attempts have been made to establish a simple functional test for the heart, but none has been completely successful. The evidence obtained by combining several is, however, valuable. All have the common characteristics of throwing some light upon the condition of the myocardium.

First among the methods of estimating the ability of the heart to meet the demands imposed upon it belongs the examination of the past history. It furnishes first, data concerning the amount of strain the heart has been, and therefore probably will be, called upon to meet by reason of the patient's habits and disposition.

In it may lie the explanation of failing compensation in a heart apparently only slightly damaged. And second, the history furnishes reliable information as to the heart's ability to respond, not to test exercises of measured amount, but to the total demand made upon it by life as the patient lives it.

In the absence of a history of a definite break in compensation, what points in the story suggest that the heart's efficiency has been seriously impaired? Careful questioning will often bring out the fact that the patient has had intermittent and transitory periods of feeling below par —especially characterized by disinclination to exercise. Not infrequently such periods are accompanied by slight, continued unproductive cough, and by rather poor sleep, for which no definite cause can be found. And occasionally there may be a story of an intermittent discomfort under the shoulder blade, or especially if the lesion be mitral stenosis, of slight pain in the praecordial area.

Such attacks are usually ascribed by the patient to any cause save the heart. But anyone who has the constant care of cardiac patients learns that the debility, insomnia and discomfort in chest or shoulder disappear under the influence of digitalis and rest, and are, in effect, signs of slight cardiac failure, and that a patient with such a history should not be subject to suddenly increased work, such as labor demands.

Whatever the physical examination reveals, such a patient, if she is to continue her pregnancy, should be placed under close observation, preferably in a hospital, in order that further tests of cardiac efficiency may be accurately carried out. The pulse rate under conditions of absolute rest and the change from it to moderate exercise should be carefully observed for several days. Taszkai states in a recent article that while normally the pulse rate increases with the change from lying to standing, this reaction is abolished early in pregnancy, and its reappearance means myocardial insuffiency. If further work supports this observation it will be a most valuable aid, but at present it can be said that a marked variation in pulse rate under conditions of rest and activity is a sign of diminished cardiac reserve.

Similar in principle is the observation of Schoonmaker of Philadelphia. He observed the variations in systolic and diastolic blood pressure in relation to posture and very moderate exercise. He concludes that with good myocardial efficiency the change from the lying to the standing position is accompanied by an increase in systolic pressure and a stationary or increased pulse pressure. Moderate exercise produces the same effect. A decrease in systolic pressure, together with a decrease in pulse pressure, has, in his experience, been associated with poor to bad myocardial efficiency. The writer has applied this test to a small series of cases, and so far agrees with Schoonmaker as to its reliability in the non-pregnant. Whether it holds good during pregnancy, or, like the pulse variation, is abolished by that condition, remains to be proved. The point is worth investigating.

During the period of observation the patient's respiration should also be closely watched. The majority of lesions encountered during the child-bearing period involve the mitral valve, and cause increased strain, particularly on the right side of the heart. Beginning cardiac failure, therefore, means less efficient pulmonary circulation, with decreased oxygenation of the blood and tissues. This condition stimulates the respiratory center, and brings about an increase in the respiration rate. And observation of cardiac patients with slightly impaired compensation shows that the respiration rate averages higher than normal, and is more easily accelerated.

Another observation to be carried out is that of urinary output. This is of value, however, only when combined with a careful account of fluid intake, and without it may be exceedingly misleading.

In all cases of mitral stenosis, no matter how perfect the apparent compensation, the apex rate should be recorded with the radial, since a discrepancy between the two, or pulse deficit, gives valuable information concerning cardiac efficiency. The deficit appears earlier in stenosis of the mitral valve than in other conditions, and may be overlooked unless searched for as a routine. While it is true that some patients with mitral stenosis carry a constant pulse deficit, that fact is no argument against the condition meaning incomplete compensation. And analysis of cases shows that it is just those patients that are most apt to die suddenly and without other warning symptoms.

Recently, interest in the venous blood pressure has greatly increased with the production of clinical methods of recording it. From a prognostic point of view the work of Clark is most interesting. In the cases observed by him, a venous pressure over 20 centimeters of water is of bad prognostic import, as is a steady rise. He has further observed that urinary output bears an inverse relation to venous pressure. His observations need confirmation on larger series of cases, but if correct, will add one more sign to the list spelling early cardiac failure.

It is the writer's belief that a patient with cardiac disease who has exhibited the signs enumerated above to a degree sufficient to warrant a careful routine examination, should, while under observation, be given one further test—the therapeutic test of the effect of digitalis. The patient is anticipating an event which must throw suddenly greatly increased demand upon the heart. During the latter months of pregnancy there is a constant though moderate dilatation of the right side of the

heart. In the majority of cases it is the right side that suffers most from the lesion encountered. It is therefore fair to assume that at some stage of the game digitalis will be indicated, and if it can be ascertained beforehand, without harm to the patient, what the effect of digitalis will be, how much that particular heart requires, and how the required dose will be borne, the physician is in possession of valuable information. It is of course not necessary to give digitalis to every pregnant cardiac patient, but the writer believes it is a measure of safety to test the effect of small doses on any who have had signs of decompensation, even though the signs were not in themselves marked enough to demand its use in a non-pregnant patient. Under careful observation, the test is in no way dangerous.

Given a patient who has had slight failure of compensation which disappears under proper treatment, what shall be done during the remainder of pregnancy? First, the decision must be made at this point as to whether the patient may be allowed to continue pregnant, or whether the uterus must be emptied. And if the latter course be decided upon, it should be carried out at once. The physician should be in possession of enough evidence at this time to make his decision sufficiently certain to act upon, for if he hesitates further, he is likely to encounter conditions which make waiting and interference alike extremely hazardous.

If the patient has had a previous break in compensation or numerous small periods of subefficiency of the circulation, or if with mitral stenosis the latter only have occurred frequently, it is the writer's belief that pregnancy should be allowed to continue for one reason only—that the patient, in full knowledge of the risk she runs, refuses to forego the chance of bearing a child. Under such conditions, sudden death or chronic invalidism are too often the result of allowing pregnancy to continue to justify the physician in advising it.

If the patient elects to run the risk, what can be done in the way of treatment? Education in sparing herself all the strain she possibly can will do much. Some writers believe that too much emphasis should not be laid on the patient's condition, arguing that in such cases optimism is a great asset. With the latter idea the writer thoroughly agrees, but optimism should be based upon the patient's ability and willingness to give herself every chance and not upon the hope that she may pull through somehow. "It is a condition that confronts us, not a theory."

Should such a patient be given digitalis more or less continually? The writer's experience with ambulatory heart cases convinces him she should. Although digitalis is said to be indicated only in broken cardiac compensation, there are in every out-patient medical clinic numerous patients whose compensation remains sufficient only so long as they take digitalis, and fails when they cease to do so. Its continued use does not provoke tolerance. There are on record at the Massachusetts General Hospital patients who have taken it practically continually for five years without harm or decreased effect. If in the latter months of pregnancy the right side of the heart is continuously dilated, and if the patient has superimposed on that condition a mitral lesion, digitalis logically should be of benefit. It is not necessary to give it daily, for, owing to its prolonged action, the patient may be kept under its influence by taking it, for example, five days a week during three weeks a month. Such a régime will often make the patient much more comfortable and will diminish rather than increase the work the heart does. Furthermore, it tends to prevent the accumulation of fluid in the abdomen and pelvic organs. The absence of demonstrable edema on the surface is not proof that it does not exist in the internal organs, to complicate operation and increase danger of infection if pregnancy be terminated, as it often is in such cases, by Caesarian section.

The other alternative is that which would be chosen for the non-pregnant patient—rest in bed so long as compensation cannot be maintained without the aid of drugs. Pregnancy, and impending labor, however, introduce the certainty that this rest cannot be continued indefinitely, and may be suddenly terminated by the extraordinary demand of labor upon the heart. In preparing for this demand, it seems more logical and actually gives better results, if the patient's general muscular tone, and particularly that of her cardiac muscle, be given the benefit of a moderate exercise, even though this régime requires the administration of some digitalis. Eliminating all exercise tends to produce muscular weakness and constipation, and is not the logical way to prepare the heart for the extreme effort of labor. That this is true practically as well as theoretically is shown by the results in such cases. Too often the heart, compensated for rest, is entirely unable to meet the demands of labor, even though that event be made as short and easy as possible. The writer believes, therefore, that it is wiser to treat the patient as an ambulatory case, guarding against decompensation by giving digitalis as described above, so long as the drug does not upset the stomach.

This latter condition cannot be too carefully guarded against. Abdominal or even gastric distention has more than once been sufficient to change the condition of the heart from good to fair, or from fair to poor compensation. The elimination of carbohydrates, and the division of the necessary amount of food into six small meals, often adds greatly to the comfort of a patient with slight cardiac inefficiency.

If digitalis is given, as suggested, any emergency arising during the period of its omission

can be met by intravenous medication—a method which should be used more often in cardiac emergencies.

In mitral lesions these emergencies are usually due to acute dilatation, mainly of the right side of the heart. Such a condition demands vigorous treatment, directed along two lines—first, the reduction of the load the right side is carrying, and second, stimulation of the heart muscle. To meet the first indication, venesection is by far the most satisfactory manoeuvre at our command. The writer has used it in twenty cases, has repeated it several times in several patients, and on the basis of this experience believes that it acts more promptly, more surely and more thoroughly than any medication. The amount of blood removed can be accurately controlled, and the bleeding stopped instantly if necessary. In emergency it can be performed in less time than it takes to give a hypodermic injection.

In obstetrics the objection may be raised against it that the patient, if labor ensues promptly, will lose still more blood, and that it is therefore unwise to deprive her of any beforehand. Venesection, however, may make all the difference between life and death. The amount of blood it is necessary to withdraw materially to benefit the heart is usually not over ten or twelve ounces. And with transfusion reduced to its present simple technic an equal amount of blood may be quickly introduced into the circulation. Venesection should not be withheld in the presence of acute cardiac dilatation from the fear of subsequent loss of blood.

For the stimulation of the myocardium digipuratum intravenously, or if the patient is free from digitalis, strophanthin intravenously have given the best results in the writer's hands. The latter has caused no bad effects when given to patients not under the influence of digitalis.

In spite of the greatest care in deciding which patients can go through pregnancy handicapped by cardiac disease, and in regulating their lives with regard to that handicap, there will be unavoidable catastrophes. Pregnancy and imperfect cardiac compensation are incompatibles, and their coexistence constitutes always a grave menace to the patient. One or the other must be eliminated; either good compensation must be maintainable under ambulatory conditions, or pregnancy must be terminated. And if the patient's life is to be saved, the decision must be reached before the latter method of meeting the situation becomes too hazardous.

Mississippi Valley Medical Journal.—It is announced that the name of the *Louisville Monthly Journal of Medicine and Surgery* has been changed to the *Mississippi Valley Medical Journal*, which will be published as the official organ of the Mississippi Valley Medical Association, and will contain all its proceedings.

SOME OF THE CLINICAL EVIDENCE RELATING TO THE ETIOLOGY OF EPILEPSY, INCLUDING SOME NOTES ON THE CONDITION OF THE TEETH AS A FACTOR IN ITS PRODUCTION, AND ON ITS RELATION TO ALCOHOLISM AND TO MENTAL DEFECT.

By Hale Powers, M.D., Brookline, Mass.,

Second Assistant Visiting Physician for Diseases of the Nervous System, Boston City Hospital.

Students of epilepsy will for some time be divided into a group who adhere to the tradition that it is primarily or entirely a disease of the brain, and a group who look upon it as an intoxication, probably of intestinal origin. The writer, although having for four years held the latter theory, has not yet been convinced that epilepsy is in every case the result of infection by a specific organism, because he has so often seen the arrest of the disease follow the correction of errors in diet and the relief of indigestion and constipation without any treatment designed to remove a supposed infection. On the other hand, he has never seen the arrest of the disease occur when these simple measures have been neglected, even after the removal of the colon, not to mention the persistent use of intestinal antiseptics.

In an article on the treatment of epilepsy by diet, published in 1914,[1] the writer said that the outcome of a case might depend upon the repairing of the teeth. This statement might well have been more elaborated at the time, and in order to show on what basis of fact it rests, I have made notes on the condition of the teeth in fifty consecutive cases. In these cases the teeth have been classified as "good," "fairly good," "bad," and "very bad." In so classifying them, certain cases have been used as standards, but it is admitted that those who know much about the teeth might draw the lines elsewhere. For example, a case in which two molars are absent and the other teeth are intact is classified as having fairly good teeth, by which is meant about the average; while one in whom one bicuspid is absent and two molars and two bicuspids are almost gone is classified as having bad teeth. One in whom four molars are absent marks the line beyond which cases are classified as having very bad teeth. Only the fitness of the teeth to perform their function of chewing has been considered, and the presence of unerupted teeth has not been sought for, because the object of the work has been merely to show that the failure of the teeth to perform their function is a factor in the production of epilepsy. In age the patients range from three and a half to sixty years. They have not been selected, and include almost all the conditions that have been supposed to produce epilepsy, with the probable exception of intracranial tu-

mor. In fully half of the cases the diagnosis of epilepsy was made before they were seen by the writer, and in none of the cases has the diagnosis been disputed by others.

Of the fifty cases, five have good teeth, five have fairly good teeth, thirteen have bad teeth, and twenty-seven have very bad teeth. Twelve of the patients when seen were subject to toothache, some of them always finding it painful to chew. All of the fifty were constipated. Twenty-five readily admitted that they were bolters and eleven that they habitually ate too much. Three had severe gingivitis. At least one had chronic appendicitis, the diagnosis being confirmed by x-ray. One had syphilis. Six were feeble-minded and one insane. One of the feeble-minded has a cerebellar hypoplasia and one has spastic paralysis. The patient with spastic paralysis is the only one of the fifty in whom there is physical evidence that the brain has ever suffered trauma. This patient is an idiot, nine years of age. She is said to have been well and normal until one and a half years of age, the age when children begin to eat solid food. She then had diarrhea and a convulsion. After the first convulsion she had many others and many falls, and for a time she was in status epilepticus, during which time she is said to have been blind, and since which time there has been spastic paralysis of one arm and both legs. Briefly, when the child began to take solid food, she had diarrhea and then a series of convulsions, during which there was a cerebral hemorrhage. The digestive troubles and the convulsions have continued. She eats a great deal when permitted, and cannot chew because the upper molar teeth are carious and the upper front teeth are absent. She is very constipated. She has improved greatly since having her diet adjusted to the condition of her teeth. In this case, where there is imbecility and a cerebral palsy, digestive troubles preceded the epilepsy, and the epilepsy has become less severe under treatment of the digestive troubles. This has been true of all cases seen by the writer. This case is not an exception, but is typical of at least the majority of cases in which the diagnosis of "organic" as distinguished from "idiopathic" epilepsy has been made. The diagnosis of "organic" epilepsy is too often made merely because there is a history of a fall or an injury to the head. Overfeeding, in a mistaken effort to restore the patient's strength, is often the actual cause of an epilepsy following an injury or an illness. The following are three of a number of cases that I have seen which demonstrate this:

A little girl, six and a half years of age, was struck by an automobile. She was unconscious about half an hour and vomited three times. Five teeth were knocked out and there was much swelling about the face and head. About two years afterwards she had a grand mal attack and six months later another. Now, at the age of nine, she is having one every two or three months. Neurological examination is entirely negative. The following facts, obtained on further questioning the mother, show how grave an error would have been made in calling this a case of "organic" epilepsy, even granting that there may have been a slight concussion of the brain. The child had to be fed through a tube for a time after the accident. She lost weight and the mother had tried to build her up. She thought home-made bread was a good thing for this purpose, and made it especially for the child, who was very fond of it, and also of beans (these being two of the articles of diet which are most certain to induce attacks in epileptics). The child is "a very hearty eater, but does not seem to gain flesh." The mother has tried to persuade the child to chew her food, but without success. The child is very restless, cannot sit still, and tosses and grinds her teeth at night. Sometimes the bowels do not move for two days.

Last winter a girl ten years of age, and otherwise well, was discovered by the school physician to have a heart murmur, and was advised to rest and have "plenty of nourishing food." Forced feeding was begun, and she ate four eggs daily for about six months. She became fat and constipated and then began to have petit mal attacks.

Three years ago a boy of seventeen had pneumonia. He had always been a bolter and a gourmand, and during his convalescence he was encouraged to eat still more, especially of milk and eggs. For three years he had several eggs and a quart of milk daily. Grand mal attacks began soon after the illness and have continued. Neurological examination is negative.

Not to study these cases from the broad, although commonplace, standpoint of the general practitioner is to be guilty of negligence. It is this failure to descend to the plane of commonsense that has made the treatment of epilepsy so unsuccessful. The statement so often made, that constipation and indigestion are the results of epilepsy, is not true. In more than three hundred consecutive cases the writer has invariably obtained a history of digestive troubles preceding the epilepsy.

Of the ten cases classified as having good or fairly good teeth, all are constipated. All have gross errors of diet. Seven admit that they are bolters and three that they are gourmands. Two have very bad home conditions and four are feeble-minded. The two with bad home conditions are a boy of fifteen who, because his father is a drunkard, is always compelled to go out and earn money to buy food before he can eat, and another boy of five who is neglected for the same reason. Epilepsy in the children of alcoholics is more rationally and more scientifically accounted for in this way than by heredity. It is desirable to emphasize this point because a great deal of labor has been expended in compiling statistics to show that epilepsy in the children is the direct result of alcoholism in the parents. It is not. It is the direct result of neglect and not of heredity. There is experimental proof of this in the fact that epilepsy in

the children of alcoholic parents is just as amenable to treatment as epilepsy in other children, provided that they can receive proper food and care.

The relation of epilepsy to mental defect is another subject in regard to which the writer believes the authorities to be in error. Its frequency in the feeble-minded has been regarded as evidence that it is a disease of the brain, but, as the writer has shown in a previous article on Diet in Epilepsy, the theory that it is an intoxication of intestinal origin is in absolute harmony with observations on the feeble-minded, and in fact it is here that some of the most convincing evidence may be found. All of the imbecile epileptics seen by the writer have swallowed their food without chewing, and have eaten more than they could digest, and some of them have had the habit of swallowing paper, wood, stones, buttons and other objects. This is the reason why the prognosis is bad in such cases. Mental defect developing after the beginning of epilepsy is another thing, and it may be accounted for in one or in all of three ways: by vascular lesions in the brain occurring during the attacks; by the destructive effect of irritating toxins upon the finer tissues and structures of the central nervous system, and by the similar effect of bromides. The first thing is known to occur, while the second and third are only reasonable hypotheses. In the children of mentally defective mothers, epilepsy occurs for the same reason that it occurs in the children of alcoholics, that is, because such children are not properly fed. Since January 1, 1914, thirty-four feeble-minded epileptic children have been examined, and there was not one without severe digestive troubles and the history of bolting and gourmandizing was given by nearly all the mothers. Some of the mothers said they allowed the children to eat almost constantly because it was the only way to keep them quiet. One of the evidences of mental defect which may be seen very early in life, and which I believe to be of some diagnostic value, is the absence of the sense of having eaten enough. It is akin to the blunting of other senses, sometimes seen in imbeciles.

Errors in diet seem to have been present in all of several hundred cases studied by the writer. By an improper diet I mean one containing an excess of fried food, fried meat, fresh white bread, and other indigestible things. Epileptic children are frequently made worse by drinking large quantities of milk. Any solid food that the patient will not or cannot chew should be forbidden. Notwithstanding statements in the text books, meat is not harmful to these patients if they will chew it. I have seen many a patient who has steadily grown worse on a vegetarian diet, improve on being allowed to eat meat, on condition that he chew it. The condition of the teeth is an important guide to be followed in prescribing the diet in epilepsy, which must be mechanically as well as chemically suitable for the patient. The theory that there is a deficiency of calcium in the tissues of epileptics seems to me to be inconsistent with the fact that my own cases have always done as well, if not better, with sodium bicarbonate treatment as with calcium lactate. The temporary relief that sometimes follows the exclusion of salt from the diet may be explained by the fact that the patient has eaten less because his food has been rendered unpalatable.[2] Recent investigators of heredity as a factor have found that it is of less importance than it was formerly considered to be, but whatever the frequency of heredity, it must not be forgotten that wrong habits of eating are handed down from one generation to another.[3]

As has been stated, twenty-seven of the fifty cases have very bad teeth. Of these cases fifteen have lost four, five, or six molar teeth; five have lost all molars; in five all upper or all lower teeth are absent or carious; in two all teeth are absent or carious; in one patient all teeth are artificial; and in one, half of the teeth are artificial. It is true that neglected teeth are seen more often in hospital than in private practice, and time has not permitted me to make notes on the condition of the teeth in fifty non-epileptic hospital patients for comparison with the fifty epileptics, but I have for comparison some data from my own records of the medical inspection of school children. In one of the Brookline schools I found, among two hundred and forty-eight children, only sixteen, or 6%, with bad teeth, according to the classification used in this work, while in this group of epileptics, 80% have bad teeth. We may conclude that epilepsy is not common in those who have good teeth.

Among my cases there are some in whom epilepsy began very soon after the loss of a number of teeth. Here are two such cases:

P. M., male, age 9.

Family History. Mother has had five pregnancies and has miscarried twice.

Past History. Birth difficult. Mother in labor three days. Instrumental delivery. Asphyxia. Weighed nine pounds. Breast fed. Did not hold head up for one year. Crept at two years. Walked with support at three years. Spoke at four years. Entered school at seven and is in Grade 3. Always promoted. Lost lower molar teeth between age of four and five. When permanent teeth appeared they soon decayed. Used to drool.

Present Illness. At the age of five he began to have attacks in which he was unconscious for a few minutes, and would clinch his fists and set his jaws. Knows when attacks are coming, and calls for mother to bring water. No other outcry. Does not bite tongue, froth at mouth, or pass urine or feces. Frequency, about once a month, sometimes with an interval of several months. Has a good appetite. Eats more rapidly than other children. His mother says, "He wants to put in a great big bite and swallow it down."

Physical Examination. Heart negative. Some tenderness over cecum. All lower molar teeth ab-

sent. Eyes negative. All cranial nerves normal. No tremor. All tendon reflexes lively and equal. Cutaneous reflexes normal. No ataxia. Gait awkward with feet apart. Movements of hands awkward. Lower lip hangs down and mouth is open, while nares are not obstructed. Expression not alert. Eyes vacant. Does not pass mental tests suitable to age and environment.

In this case there was probably trauma at birth, causing mental defect, but the epilepsy did not begin until the age of five, and it followed the loss of the molar teeth.

A young woman of twenty was operated on for appendicitis three years ago, and after the operation she suffered from constipation. All her upper molar teeth and upper incisors were artificial and supported by bridge work. A year ago, because of severe trifacial neuralgia the artificial teeth were removed, so that she could no longer chew her food. The neuralgia was not relieved, and soon after losing the teeth she had an epileptic attack, and she has had three other attacks since then.

The work of having the teeth of these patients repaired proceeds very slowly, but at some future time I hope to report the results, if any, thus obtained. At this time it can only be said that those patients who have had the work done are doing well.

When there is difficulty in making a diagnosis between epilepsy and hysteria, or between epilepsy and intracranial tumor, a bad condition of the teeth, in which the chewing surface is inadequate, is evidence in favor of epilepsy.

Epilepsy is rare in breast-fed infants, and it does not often occur before the age of eighteen months. In another series of fifty epileptic children under twelve years of age, the writer found that in only seven it began before the age of one year, while in twenty it began between the ages of one and two, and in only twenty-three did it begin during the long period from two until twelve. Therefore, epilepsy in childhood usually begins at the time when the child is beginning to eat solid food that requires chewing, and when the teeth are often not sufficiently developed to do the work. In four of this series of epileptic children there was spastic paralysis, demonstrating injury to the brain, but the four were all feeble-minded, and gave the usual history of gourmandizing and bolting of food, which the writer believes accounts for epilepsy in the feeble-minded.

Epilepsy resembles tuberculosis in having no specific cure, and it should be treated, like tuberculosis, by common-sense methods, with close attention to detail. It has to be regarded at once from the viewpoint of the neurologist and from that of the general practitioner. Three years ago the writer suggested intestinal surgery in some cases of epilepsy, but he has seldom been compelled to advise surgery, because good results can be obtained without it, and in the majority of cases the dentist, rather than the surgeon, should be consulted.[4] The prognosis in many cases of epilepsy depends largely upon the possibility of repairing the teeth.

The series of fifty cases is, of course, too small to prove that eighty per cent. of all epileptics have bad teeth, but if in a larger series the percentage were to differ by twenty-five with the percentage in my series, it would still show the majority of epileptics to have bad teeth. Most of my patients have been children, and in a series of adults the percentage having bad teeth would probably be higher.

The series of over 300 cases, in every one of which digestive disturbances preceded the epilepsy is, I believe, large enough to answer conclusively the question of whether the visceral changes found in epileptics at autopsy are primary or secondary.[5]

I am indebted to Drs. J. J. Thomas and A. W. Fairbanks for the use of the material in the Children's Hospital, where about one-third of the cases were seen.

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[4] Powers: "The Rôle of Gastric and Intestinal Stasis in Some Cases of Epilepsy," BOSTON MEDICAL AND SURGICAL JOURNAL, Aug. 7, 1913.
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Clinical Department.

A CASE OF EPIDURAL INTRASPINAL ABSCESS OF PYOGENIC ORIGIN.

BY W. J. MIXTER, M.D., BOSTON.

THE following case is reported in full on account of its rarity and also on account of my belief that there must be a few such cases, which, were they recognized and drained in time, would result favorably. It is a companion case to one reported herewith by Drs. Ayer and Viets.

Patient seen with Dr. J. W. Shaw of Newburyport, following a consultation with Dr. F. T. Lord of Boston, who advised exploratory laminectomy.

F. H.—Male, 17 years of age. *Family history* unimportant.

Past History negative except for furunculosis of face, which has been present to a greater or less extent since adolescence, and which has been quite severe during the past few weeks.

Present Illness. Sixteen days ago began to have pain in the left shoulder and about the left side of the chest, level of the fifth rib, increased on respiration. Also complained of sore throat. Was at home from school for a few days but did not see

his doctor. Improved enough to go back to school, but was still uncomfortable and evidently not in good health. Five days ago he was first seen by Dr. Shaw, as he had suddenly developed acute retention of urine. He was catheterized that day and examination of the urine was negative. There was no evidence of stricture or other obstruction. The next day he developed stiffness and weakness of both legs, headache, and stiff neck. The retention persisted. This was rapidly followed by a spastic paraplegia with temperature of 101°, and he was taken to the Anna Jaques Hospital. Lumbar puncture gave clear fluid not under excessive pressure with 2 cells per cc. Since then temperature has risen steadily and the paralysis has become complete in the legs. Seen by Dr. Lord last night.

Examination shows temperature 105, pulse 118, respiration 24, blood pressure 120, white count 30,000. Marked furunculosis of face. Throat somewhat reddened. General physical examination otherwise negative.

Neurological Examination. Conscious. Slightly confused mentally. Pupils equal and react normally. No choked disc. Other cranial nerves normal to hurried examination. Head held turned somewhat to the left. Neck stiff; rest of spine shows normal flexibility. No kyphos made out. Definite ataxia of hands (finger to finger and finger to nose). No motor or sensory paralysis of arms or hands. Arm reflexes not increased. Definite zone of hyperaesthesia from 7-9 D; complete anesthesia below that level. Legs paralyzed, priapism, and retention of urine. Skin reflexes: abdominal not obtained. Cremasteric equal and normal on two sides. Normal plantar on left, Babinski on right. Tendon reflexes: knee and Achilles jerks not obtained. Kernig absent.

Lumbar puncture gave clear fluid with very faint yellow tint, not under pressure, which showed a definite coagulum on standing. Proteids greatly increased by ammonium sulphate and alcohol precipitation. Rare cell.

No x-ray was taken.

Operation. Laminectomy 3d to 6th dorsal inclusive. Beneath the epidural fat and outside the dura was found an abscess cavity cylindrical in shape, running from the 3d cervical to the first lumbar vertebra and containing a large amount of creamy, greenish yellow pus under considerable tension. No evident focus of infection could be made out. The abscess cavity was drained with rubber and the wound closed rapidly. The patient died a few hours later. No autopsy was allowed. The pus showed a pure culture of staphylococcus aureus.

Discussion. A few words will suffice. By careful consideration of symptoms and signs it was evident that we were here dealing with a transverse myelitis from an acute process; a pyogenic abscess was thought most likely, but the absence of knowledge of previous cases made us wary of exact diagnosis. The abscess found is to be considered, in my opinion, metastatic from the furunculosis or from tonsillar infection which was present in this case, in the same way that staphylococcus infection occasionally is found in perinephritic fat. The possibility of extension from an osteomyelitis of the vertebra must be considered, but the operative findings make me feel that this was not the case; unfortunately, autopsy proof of this is lacking.

While extra-dural abscess formation of this type is rare, its importance is considerable, in that operation undertaken early should give in favorable cases relief from paralysis and bring about a cure. Certainly, the outlook should be considerably brighter than in cases where the abscess is secondary to infection of the spine.

Text-books on neurology and surgery are practically silent on this subject. Even in Elsberg's recent work, we fail to find mention of this type. It is for this reason that this case and the accompanying case of Ayer and Viets are here reported.

INTRASPINAL EPIDURAL ABSCESS (PYOGENIC): CASE WITH AUTOPSY.

By James B. Ayer, M.D., and Henry R. Viets, M.D., Boston.

[From the Departments of Neurology and Neuropathology, Harvard Medical School.]

The two cases of epidural abscess of pyogenic origin here reported are worthy of consideration, not only because of the rarity of the condition, but because points of real diagnostic and therapeutic value are involved. True, both of these patients died, but there is nothing in either case which proclaims an unnecessarily bad prognosis for others of similar nature. Such a happy outcome was indeed obtained in one case reported by Raymond and Sicard.[1]

An exhaustive study of the literature has not been attempted, but a moderately thorough reading yields few references to the subject at hand. In Lewandowsky's Handbuch,[2] where if anywhere one would look for light, references were found to but three cases falling into the group of epidural pyogenic abscesses, nor have we been able to fare better elsewhere. It should be here stated for clearness that from this group we exclude all cases of abscess primary in vertebrae or spinal cord; the condition here dealt with is this: *pus collection inside of spinal canal, but outside of the dura; its origin being metastatic or by direct extension; the organism pyogenic and not tubercular.*

Without further comment we will present our case:

O. J., 43 years, on August 20, 1915, while roofing a house, scratched his right breast on a nail; from this an abscess developed, and on September 3 broke, yielding subsequently to surgical treatment. About September 11, however, the patient complained of "pleurisy pains" in left back and later also in left lower chest, which persisted, accompanied by a temperature of 102-104°. On September 26 he could not pass urine for the first time, and complained of pains in legs as well as back. His back was rigid and tender over the seventh and eighth dorsal spines. The next day he

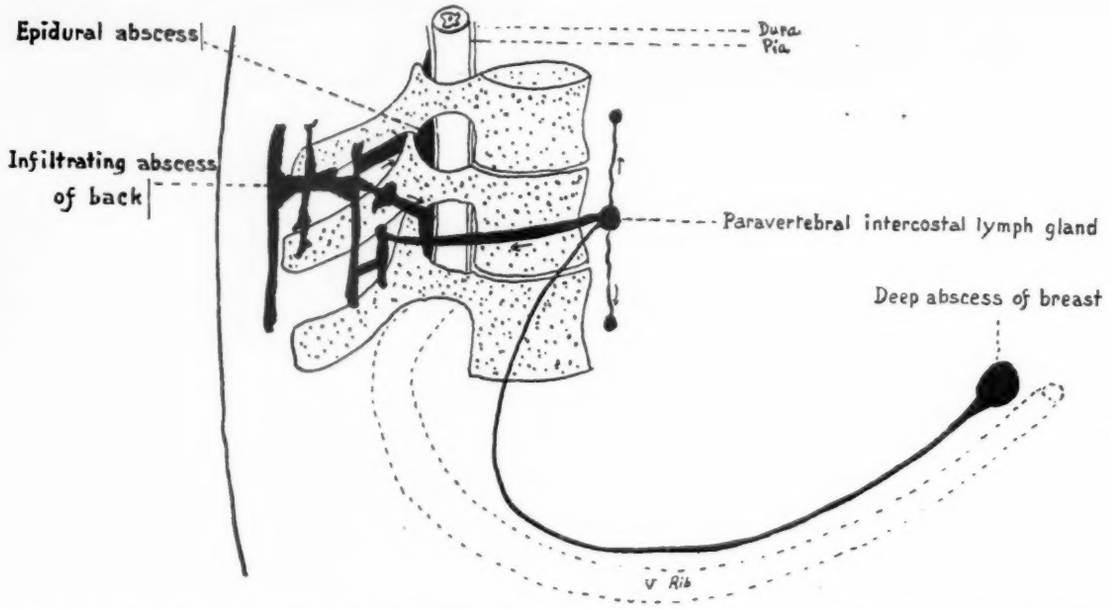

Diagram to show course of infection from deep breast abscess by intercostal lymphatic to lymph node; thence by direct extension to back muscles and epidural space.

had difficulty moving his legs, and by September 29 he was paraplegic, with urinary and fecal incontinence. Neurological examination showed, besides the almost complete paralysis of legs, a mild bilateral sensory disturbance below umbilicus; k.j. present, a.j. not obtained, plantars normal, abdominal and cremasteric reflexes absent. Head and arms not remarkable. Examination of the back showed some fullness only in dorsal region and crackling râles at bases of lungs. Lumbar puncture gave 4 cc. only of clear yellow fluid, under no excess of pressure; the fluid clotting almost immediately. In twelve hours the fluid separated spontaneously from the clot and was found to give a negative Wassermann, a gold sol in the "meningitis" zone, great excess of proteids, and to be sterile on culture; the clot was macerated, and examined for cells, one only being found.

In seven days the patient died.

Abstract of Autopsy. Five hours post mortem.

Just to the right and below right nipple is an area, 10 cm. in diameter, of granulation tissue; from it no pus can be expressed, nor is there any in the surrounding tissue. The first incision into the back, however, yields a thick greenish pus; investigating deeper and more extensively shows that this pus has infiltrated the trapezius, latissimus dorsi and erector spinae groups of muscles. Dissecting to the spinal column, pus is seen to well up between the vertebrae, and when the laminae and spines have been removed, a thick coating of pus hides the dura from view for a distance of 10 cm., corresponding to the fifth, sixth and seventh dorsal vertebrae. The pus is easily stripped from its position on dura and from the nerve roots which it surrounds, leaving the former perfectly normal in appearance. The dura opened reveals a glistening inner surface and a cord of normal appearance, but the spinal fluid in the lumbar sac is of yellow color and, as analysis shows, is similar to that withdrawn previously. Even on section the cord presents everywhere normal appearance and markings.

Turning now to the pleural cavities: both contain a small amount of sero-fibrinous fluid and a few fibrinous adhesions, especially posteriorly on the right. On cutting through the pleura at this region pus exudes, and search shows that it comes from two sources, the erector spinae muscles and necrotic paravertebral intercostal lymph glands, the latter being affected more particularly in the neighborhood of the fifth dorsal vertebra.

Other post-mortem findings are inconsequential. Abdominal cavity normal, but pericardial cavity contains slight excess of fluid. Intestines, pancreas, liver, kidneys, adrenals, heart and aorta all normal. Lungs show congestion only. Lymph glands of mediastinum, roots of lungs and mesentery all normal in size and appearance in contrast with the paravertebral glands above presented. A section of the fifth rib half way between axillary line and vertebral attachment shows medulla yellow-red, and no abnormality of the periosteum. Spleen large and soft. Cultures: pus from the back muscle; pericardial fluid and fluid from right pleural cavity—staphylococcus albus in pure culture. Heart's blood, no growth.

Microscopic Examination was carried out in routine manner on the tissues of the body, without striking addition to the gross findings. Microscopic examination of the spinal cord is, however, of considerable interest and importance, and is here given. First to be noted is that there is no distortion of the cord in the region of pressure and the size of the cord is not diminished; in fact, sections at one level suggest an actual, though slight, enlargement of the cord, fibers being separated more than normal, with presence of vacuoles, the cord at this point to the naked eye giving a moth-eaten appearance. While there is no certain destruction of nerve fibers, such degeneration is suggested by the presence of a few phagocytic cells in the rarefied areas of the white matter. Throughout the white also, but more particularly near the rim of the cord, a moderate increase in number and size of neuroglia cells is seen, some with faintly-staining protoplasm; no evident increase of glia fibrils is to be seen. The gray

matter presents normal configuration; the anterior horn cells are present in correct number, but many present the axonal reaction. Vessels appear normal and there is no evidence of dilatation or cellular infiltration of perivascular spaces. The pia is of particular interest because of its proximity to the abscess, which is separated from it only by dura. The pia shows a slight cellular infiltration, and on close examination the cells are found to be largely fibroblasts with a few plasma cells and lymphocytes; no polynuclear leucocytes are seen in the pia. Nerve roots, both dorsal and ventral, show perhaps a slight increase in fibroblasts, but no evidence of exudative cells.

DISCUSSION.

As clearly as ever falls to our lot, we are here enabled to follow the sequence of events from August 20, the date of the original infection, to death on October 6, which for clearness may be summarized: infection of skin of breast by a nail, leading to deep abscess formation; extension by intercostal lymphatics, chiefly fifth, to intercostal paravertebral lymph nodes, with destruction of the fifth, and subsequently one or two more, while at the same time the *point of infection heals;* infection then proceeds by continuity, at first causing a sero-fibrinous pleuritis, not leading, however, as would be expected, to lung abscess, but proceeding backward into the deep muscles of the back; thence upward and downward in these, and also inward between vertebral spines and intervertebral foramina until sufficient pus had accumulated over dura mater to cause pressure on spinal cord and symptoms of "transverse myelitis." The organism concerned is staphylococcus albus. (The accompanying diagram gives, in graphic form, the route of infection.)

Knowing the case as we do now, could surgery have helped? It is unlikely that anything could have been attempted until September 26, when the patient first complained of his back, the first indication that these back muscles had become infiltrated; the second warning, and one which the writers would now consider of great importance, is the onset of cord symptoms of the nature of a transverse myelitis, but especially the accompanying findings in the spinal fluid, namely, the "*syndrome de coagulation massive et de xanthochromie.*" Such findings in the spinal fluid are, in the belief of many,—Froin[3] who described the fluid in 1903, of Raven,[4] Nonne,[5] of Mestrezat,[6] and others,—almost pathognomonic of pressure on spinal cord; the authors[7] have themselves recently reported a series of such cases, and are in hearty agreement as to its significance. It is not unlikely that even at this time surgery could have benefited if generous laminectomy had been performed.

Turning to another aspect of the case, it is interesting to note the efficiency of the barrier to infection presented by the dura. Pus must have lain on the dura under considerable pressure, if we may judge from symptoms produced and its configuration at autopsy, for at least nine days, and yet no infection of the cerebrospinal axis had taken place, as proved by negative culture, taken during life, and absence of cells characteristic of acute inflammation at autopsy. We know that the lymph stream is outward from the spinal canal, and yet it is astounding that under pressure this direction should not be reversed in all this time. Even more striking in this regard was the case of E. A. Oppenheim,[8] who reports a case of similar nature in which pus had pressed upon the dura for 25 days without subdural infection! The changes within the cord are interesting; though no true infection of the cord has taken place, there is already evidence that a breaking up of the cord is under way, as evidenced by the phagocytic cells found in this substance, by the axonal reaction of the anterior horn cells, and by the proliferation of neuroglia suggestive of attempt at repair.

We wish to express our thanks to Dr. Nathaniel S. Hunting of Quincy and Dr. Walter E. Paul for clinical data in connection with this case.

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Medical Progress.

REPORT ON OBSTETRICS.

By Robert L. DeNormandie, M.D., F.A.C.S., Boston.

ABDOMINAL PREGNANCY.

Solomons[1] reports a case of abdominal pregnancy which occurred in his practice, with a brief review of the causes and treatment. He defines abdominal pregnancy as a development and growth of the fetus in the abdominal cavity, which may be either primary or secondary. He regards a primary abdominal pregnancy as unlikely, and thinks that secondary abdominal pregnancy is more credible.

He regards the diagnosis of abdominal pregnancy as extraordinarily difficult, making note of the fact that various men have tapped the abdomen, thinking that these cases of abdominal pregnancy were ovarian cysts. The diagnosis of this condition may be established by the following points: the extreme sensitiveness to palpation; there are no intermittent contractions; the irregularity of the outline of the

tumor; the fetus is directly under the skin, and the heart sounds are directly under the ear; a further point is that retroversion is a common accompaniment of this condition.

He records the history of a patient, a woman of thirty-three, married ten years, who never became pregnant until the present instance. Her last menstruation was early in July, and she was admitted to the hospital on December 31. Four months before admission to the hospital she had pain in the abdomen, which gradually increased until it became unbearable. She suffered from dysuria. Examination of the abdomen showed a mobile tumor, dull on percussion, fairly regular in outline, extending to the umbilicus. Bimanual examination showed the cervix to be retroverted. The tumor in the abdomen seemed connected with the cervix, yet there was a soft, cystic swelling in the front and lateral fornices, and this was also connected with the abdominal tumor and cervix. Fetal parts and movements were distinguishable, both abdominally and by the vagina. Solomons said he could not make a definite diagnosis, and he determined to open the abdomen. He opened the abdomen and found a tumor, hemorrhagic in appearance, stretching a little beyond the umbilicus. Separating the adhesions between the tumor and the intestines in the omentum, a finger entered the amniotic sac and a fetal foot appeared. There was much hemorrhage, which was stopped by oversewing. He removed the fetus and placenta, and with it the right tube. The uterus, left tube and both ovaries were left *in situ*. He found the uterus lying retroverted, practically imbedded in the tumor which filled the pelvis. The patient was in poor condition, and he closed the abdomen as quickly as possible. The abdominal wound healed by first intention, and she was discharged from the hospital in good health on the twenty-sixth day.

Solomons makes a few remarks on the treatment of abdominal pregnancy from the time when the condition was first found post mortem, next until treatment was postponed until after the death of the child, then when the child was removed and the placenta was left. There is a review of the literature, and from his own case he feels that the rational treatment is to remove the fetus and placenta and to stop the hemorrhage, and that it is bad policy to leave the placenta *in situ*.

There is a short bibliography at the end of the article.

THE APPLICATION OF ANOCI-ASSOCIATION TO OBSTETRICS.

Hoag[2] has been studying a number of cases where the anoci-association principles were applied in obstetrics, combining with the principle, nitrous oxide and oxygen, chloroform and ether, or chloroform alone with the anoci-association. Combined with some of his cases he used scopolamine. In all cases the perineum was injected with a 0.25% novocaine, in varying amounts from 50-160 cc. Eleven patients he gave in addition 30-40 cc. of 1% quinine-urea solution. The maximum amount of the two solutions injected in any one case was 175 cc. An injection was made as the head appeared in sight. The vulval edges were turned back, and a long needle was inserted at the muco-cutaneous border. Novocaine was injected first and the quinine-urea immediately afterwards. By this technic, he says, the levator-ani and the perineal body can be readily infiltrated. He tabulates his cases under three groups: first, those that received nitrous oxide, scopolamine and perineal injections; second, those that had nitrous oxide and chloroform or ether with scopolamine and perineal injections; third, those that had chloroform only for delivery, no scopolamine, but had perineal injections.

He concludes that nitrous oxide analgesia is safe to both mother and child, and the use of limited amounts of scopolamine during the first stage is a distinct advantage, shortening the time during which gas is required, and making the analgesia more complete. He believes that the injection of the perineum is a distinct help in securing relaxation of the outlet, and he feels that there is no complication whatsoever resulting from the perineal injections. The combined use of scopolamine, nitrous oxide oxygen and local infiltration offers a practical and efficient means of conducting labor, and extends "anociation," in its broadest sense, to the obstetrical field.

PERINEAL ANALGESIA IN LABOR.

King[3] reports his experiments at perineal analgesia in a very interesting illustrated article. His technic is as follows: First, he uses 2% solution of novocaine, sterilized by boiling. To this solution he adds one-third of a minim of 1:1000 solution of adrenalin chloride to each cm. He then palpates the pubic arch to be sure of the landmarks where the injection should take place, and this he clearly shows in the diagrams. The anterior injection is made 2-4 cm. below the vagina and 2 cm. from the rami of the pubis. The needle is passed 2-4 cm. in depth, corresponding to the level of the hymen. The expression of sudden pain as the needle meets the positive resistance of Colles' fascia, indicates the proper depth. The posterior injection is midway between the anus and the tuberosity, with the needle inclined, and injection takes place at about 4 cm. The injections are made bilaterally. Primiparae, he states, require only anterior injection, while multiparae require both anterior and posterior injections.

He summarizes his paper by saying that in nearly one hundred injections no adverse results have followed. Analgesia begins in a few minutes, and is prolonged two to four hours. Lacerations are diminished in number and ex-

tent, for the consciousness, without pain, of the patient, allows retardation or advancement of the presenting part at will, thereby developing the fullest elasticity possible. Hemorrhage is greatly diminished, due to adrenalin and lessened extent of tears. The repair of the tears is greatly facilitated because of the anesthesia, and when the posterior triangle is infiltrated, all the obstetric area can be rapidly and painlessly sterilized by iodine under this preparation. He finally states that the general practitioner can safely and easily apply the method at the bedside.

A STATISTICAL STUDY OF 635 LABORS WITH THE OCCIPUT POSTERIOR.

After a very thorough analysis of 635 labors where the occiput was posterior, Plass[4] comes to the following conclusions:

1. The frequency of occiput obliquely and directly posterior positions was 11.57% in the series (7500 cases).
2. Rotation of the occiput into the hollow of the sacrum occurred in 14%.
3. Three factors which tend to favor rotation into the hollow of the sacrum are, poor flexion, small size of the head, and funnel pelvis. Contractions of the pelvic inlet favors anterior rotation.
4. The etiology of internal rotation is not satisfactory; but Hodge's theory of the ischial spines and inclined planes is most acceptable.
5. Premature rupture of the membranes was not especially frequent when the occiput was posterior.
6. Spontaneous delivery was the usual outcome. The total operation incidence was 22.9%, but in only 11.02% was the position possibly accountable for the need for intervention.
7. There was no increased infant mortality because of the posterior position.
8. Labor was not prolonged, independently of whether the occiput rotated to the symphysis or in the hollow of the sacrum.
9. A contracted pelvis did not increase the incidence of the posterior positions.
10. There was no additional maternal morbidity or mortality.

CARE OF THE PERINEUM.

Plass,[5] in order to determine whether routine antiseptic treatment of the perineum after delivery had any beneficial effect upon the course of the puerperium or upon the healing of primary perineal repairs, carried out the following clinical experiment:

All patients delivered from November, 1914, to August, 1915, were divided alternately into two groups, A and B. Group A were given the routine perineal care with antiseptics. Group B were given no special attention. The routine perineal care consisted in bathing the vulva and perineum with cotton pledgets soaked in 1:2000 bichloride of mercury solution every four hours, as well as after each defecation and urination for the nine days the patient remained in bed. In Group B the patients were merely kept macroscopically clean with warm tap water and soap and a wash cloth. Unless the patient was very ill, she was expected to clean herself. In this group Plass found the average number of cleansings necessary were four a day for the first three days; from the third to the sixth day not more than two a day, and after this only one.

The results obtained by the two methods Plass tabulates in two tables, and from these tables he concludes that the routine care was followed by many poor results, whereas excellent results were obtained by the new method, and, therefore, the use of antiseptic solutions in the care of the perineum is of no value; macroscopic cleanliness alone giving better results. In addition, he says that much economy in the time of the nurses is obtained.

POST-MORTEM CESAREAN SECTION: A REPORT OF TEN CASES.

Harrar[6] reviews the early cases of post-mortem Cesarean section reported, noting that in 107 reported cases no living child was extracted. In 1914 Hallman reported 68 cases, with 61-68% of living children. Harrar advises against post-mortem version or forceps, unless the death of the mother occurred during the second stage of labor.

Harrar advises the physician to secure the consent of the husband or the family if instantly at hand, but he says if consent is not obtained and the fetal heart is still going, it is not only permissible, but imperative, for the physician to do all he can to save the child. Bacon has shown that Cesarean section is legal without consent, and must be done if the child is viable and alive.

The ten cases which Harrar reports occurred, are from the clinic of the Lying-in Hospital. Of these ten cases, three babies were still-born. Four babies were born with hearts feebly beating, but with no attempts at respiration. One baby gave a few feeble gasps and died. One baby, slightly asphyxiated at birth, died on the sixth day of pneumonia. One baby, badly asphyxiated at birth, left the hospital living and well, and one cried at delivery and was discharged well.

DOES ADMINISTRATION OF PITUITRIN TO THE MOTHER PRODUCE DIFFUSE NERVOUS LESIONS IN THE INFANT?

Heard[7] raises the question, whether the administration of pituitrin to the mother can cause nervous lesions in the infant. He reports three cases in full where the infants shortly after birth showed evidences of extensive cerebral injury, due, Heard thinks, undoubtedly to the birth. These three cases were not first-born;

in no case was there any constitutional disease on the part of either of the parents or of the children; in no case was there any question of a prolonged or difficult labor; in each case a precipitate delivery was effected by pituitrin.

Heard concludes: (1) that the improper use of pituitary extract in labor is a cause of cerebral or meningeal hemorrhage in the newborn; (2) that hemorrhages in the nervous system of the infant, resulting from the use of pituitrin in labor are productive of diffuse nervous lesions so extensive as to result in early death, or if the child survives, in the terrible afflictions of paralysis, epilepsy and idiocy; (3) that cases presenting nervous lesions resulting from birth injuries should be carefully investigated as to the possibility of pituitrin having been a factor in the causation.

RUPTURE OF THE SCAR OF A PREVIOUS CESAREAN SECTION.

Findley's[8] article on rupture of the scar of a previous Cesarean section is based on his review of the literature of the subject, out of which he has found sixty-three cases of rupture of the scar. He says that when he began his review he had prejudice in favor of repeated sections, but as the work developed he concluded that such a position was untenable.

The greatest factor in the production of insecure wound healing is septic infection. He admits that there is no positive assurance of obtaining a perfect wound healing, whatever the method of suturing or whoever the surgeon. The uterine scar is an unknown factor in all cases. The transverse fundal incision has given more than its share of ruptures, and as yet it is too early to state how well the scar in extraperitoneal and cervical sections will stand repeated pregnancies and labors.

The sixty-three cases which he found are carefully tabulated and analyzed, and his conclusions are:

1. A perfectly healed Cesarean wound may be relied upon to resist the forces of labor, but in view of the fact that the integrity of the wound is an unknown factor in all cases, we are constrained to exercise the utmost caution in the conduct of every case in pregnancy and labor following Cesarean section.

2. Failure to secure perfect healing of the uterine wound is because of departure from the principles of suture proposed by Sanger, or because of septic infection.

3. Latent gonorrheal infection may defeat the most painstaking effort.

4. When a Cesarean section has been followed by a fever course, the uterine wound should be regarded as insecure, and should call for a repeated section at the onset of labor.

5. Sterilization and hysterectomy should replace conservative Cesarean section when infection is known to exist.

6. The possibility of rupture of the scar following Cesarean section does not justify sterilization. In subsequent pregnancies the labors should be hospital cases, and if the wound is known to be defective, then a repeated section should be done.

7. Version, high forceps, hydrostatic bags and pituitrin should never be used in the presence of a Cesarean scar.

8. There is evidence that not more than 2% of ruptures occur in subsequent labors, and that, therefore, we are not justified in voicing the slogan, "Once a Cesarean section, always a Cesarean section."

Findley finally adds, however, that the liability of rupture is real, and, therefore, this should stand as an argument against the increasing tendency to widen the scope of elective Cesareans.

A long bibliography follows this article.

MEDDLESOME MIDWIFERY IN RENAISSANCE.

From DeLee's[9] article one gathers that at the present time there is much meddlesome midwifery going on throughout the country. He feels that the average physician does not give to the cervix its proper importance, and that the serious tears that the cervix is subject to are a cause of much invalidism.

He feels that the notion which the public and the profession have entertained for many years, and which is becoming more prevalent among the profession of late, that natural labor should be curtailed as much as possible, is explained partly by the agitation in the lay press for the relief from suffering of childbirth. He says that methods to shorten the time of labor have been multiplied, and great virtues have been claimed for them. He says that, without doubt, protracted and painful labor does weaken the parturient, but that there are no permanent effects from this. The amount of surgical trauma determines the smoothness of recovery even more than the stress of the nerves. DeLee calls attention to some of the most common evils which have gained footholds in obstetrics. The first he notes is the attempt to cut short the period of dilatation of the cervix. Manual dilatation, he says, always tears the cervix. Colpeurynters often do, and almost invariably do, if traction is put on them. In addition, they pull the cervix downward, while the uterine action pulls it upward. The danger of infection attends all these manoeuvres, though he says it is true that women seldom die of sepsis, but the morbidity, immediate or postponed, is high. Another form of interference is the indiscriminate use of twilight sleep, gas and oxygen, and other anesthetics. DeLee says that he, himself, uses anesthetics too often and too liberally, and that this increased use of anesthetics has increased the number of forceps operations, lacerations and post-partum hemorrhage in his

own practice. He further warns the physicians against allowing the parturient to bear down before the cervix is fully dilated, for by this the cervix is dislocated and much damage follows. He warns against too frequent vaginal examination and the "ironing out of the perineum." He favors the use of rectal examinations, and states that with little practice great efficiency can be obtained. He regards the giving of pituitary extract the most dangerous of all the meddling practices. He refers to sixteen cases of rupture of the uterus that are on record, and states that hardly a month goes by but that he learns of cases in which the baby has been lost after the use of pituitary extract. He demands that pituitary extract be used only in the presence of a really scientific indication.

He again repeats the charge that the abuse of obstetric forceps is real, and he deplores the fact that often the indication is "bed-time, office hours or some other set appointment." DeLee makes another interesting point, that Cesarean section is too frequently performed, commenting on the fact that in some communities it seems that the only method of solving difficult obstetric problems is to cut them.

PUERPERAL GANGRENE OF THE EXTREMITIES.

Stein,[10] in a very complete article in which he has given abstracts of all the cases that he can find up to the present time of puerperal gangrene of the extremities, reviews the etiology, symptoms, prognosis and treatment of this serious complications of the puerperium. He also reports two cases of his own. His first case was that of a woman who had a septic abortion at three months. The temperature varied for six days in the puerperium between 104 and 105°. Stein examined the patient on the seventh day, and he decided to curette her, as the uterus was still enlarged and soft. After the curettage, the interior of the uterus was swabbed with tincture of iodine, and this was repeated the next seven days. Even after the curettage, the temperature did not drop, but kept between 101 and 102°. Seven days after the curettage the patient began to complain of pain in the right leg, and three days later the right leg and foot began to swell, became cold and showed bluish discoloration. Pulsation in the dorsalis pedis artery was not felt, and the foot was extremely painful to the touch. The line of demarcation became marked, and three days later amputation was performed below the knee. The patient then recovered.

His second case was a patient delivered at term by forceps. Had a second degree laceration repaired with chromic catgut sutures. Two days after delivery patient had slight chill, with temperature of 104.5°. Temperature varied from 101 to 102°. Six days after the delivery, sutures were removed because the whole area was sloughing. Patient continued to run a temperature varying from 103 to 104°, and, in spite of her very serious condition she left the hospital, against advice, twelve days after delivery. She was readmitted seven days later with a temperature varying between 102 and 104°. Examination revealed both feet symmetrically discolored for a distance of about four inches above the ankles, and were nearly black and the skin was shrivelled. Both feet were extremely tender on touch, and in some places showed vesicles filled with a whitish fluid. Even though the line of demarcation was well pronounced, the patient's condition did not permit of any operative interference, and she died on July 19, five weeks after the delivery. No autopsy was obtained.

Stein says that the arterial origin of peripheral puerperal gangrene is probably the most common, and is probably always due to infection. Thrombosis of the arteries of the leg might be due to an ascending thrombosis of the uterine artery. The smaller blood vessels sometimes become obliterated through embolic plugs, which often become detached from the thrombi in the large arteries. In favorable cases, onset of gangrene is prevented by the establishment of compensatory collateral circulation. Stein says it is not clear why, in certain cases, the septic process becomes localized in the internal wall of an artery, and in other cases in the venous wall, or in both. The most common cause of peripheral gangrene is known to be a septic endarteritis and embolism from diseased heart valves usually occurring in cases of grave puerperal pyema. Mechanical factors, recumbent position and relative immobility of the entire body may also enter into the cause. The majority of these gangrenes concern the lower extremities, although the upper extremities are occasionally involved. In regard to the symptoms, pain is very pronounced and never absent in extensive vascular obliterations such as lead to peripheral gangrene. The ordinary symptoms of puerperal fever are present in the majority of cases, and sudden onset usually points to embolism in the arterial system, while, on the other hand, the gangrene may develop very insidiously in the case of a small embolus. The absence of arterial pulsation below the thrombus is an important sign. The sensibility is usually distinctly diminished, while mobility may be preserved. A livid discoloration and a relatively diminished temperature of the affected area add to the probability of incipient gangrene. The prognosis of puerperal peripheral gangrene is governed by the time of the performance of amputation. Unfortunately, amputation is not always practicable on account of the patient's bad condition or because the seat of the obstruction is located high up in the aorta. One-half to two-thirds of the patients die. The treatment consists of purely conservative measures and the appearance of the line of demarcation is a signal for amputation. Prophylaxis is that of ordinary aseptic and antiseptic management of all deliveries.

POSTURE IN OBSTETRICS.

In an illustrated article, Markoe[11] shows the development from ancient times of the so-called obstetric chair. He says in the development of the use of forceps the necessity of posture was gradually lost sight of, so that at the present time but little is said in its favor. Markoe feels that the first stage of labor should be observed more carefully than it has been in the past, and that obstetricians, both in the hospital and in private practice, should exert their efforts to make this stage as short as is compatible with perfect safety. He feels that posture is of great assistance, and it is because of his desire to make use of this procedure that he first revived the so-called obstetric chair. His method is as follows:

When regular contractions have been established, the patient is instructed to conserve her strength by not remaining too long in one position, but to sit from time to time in the chair, with the knees elevated so that they support the enlarged abdomen and to have the chair so padded with pillows and blankets that the maximum of comfort is offered. By thus sitting in a chair as he has depicted it—a rocking-chair can be used—the weight of the uterine contents is exerted on the cervix, not in a harmful way, but with a steady hydrostatic pressure that at this stage does more to shorten the labor than anything else. If the patient becomes restless in the chair, or the contractions are severe, she may with benefit walk about the room, or even recline. The inclination of the chair, he says, is of the greatest importance, for by changing this inclination the axis of the uterus may be made to point directly into the pelvis. Markoe says that since he has used the chair he has performed fewer operations, such as Cesarean section, versions and forceps, and that there is a decrease in the deaths of mothers, fewer stillbirths and fewer deaths of the child following labor. As far as perineal lacerations go, it has apparently made no difference with them. In his article there are various tables which show the length of time which the patients were kept in the chair, the various abnormal conditions met, and the results obtained.

ACCIDENTAL HEMORRHAGE.

Wing[12] reports two cases of accidental hemorrhage upon which he did Cesarean section.

The first patient, a primipara 7½-8 months pregnant, twenty-two hours before admission to the hospital, fell heavily against the bathtub, striking her abdomen. Abdominal discomfort followed at once, and in three or four hours the patient was having severe abdominal pains, with cramp-like exacerbations. Ten hours after she fell she began to bleed by vagina.

When examined at the hospital she was nearly exsanguinated; slight bleeding from the vagina. Cervix barely admitted a finger, and no placenta was felt. The uterus was of the size corresponding to a pregnancy of eight months and was tonically contracted, having the consistency almost of wool. No fetal heart heard.

Cesarean section was determined upon, and when the uterus was exposed it was found firm, somewhat distended, much deeper in color than normal and showing numerous petechial areas. The uterus was incised and the placenta found in the region of the fundus, almost entirely separated. The dead fetus, placenta, membranes and clotted blood were removed and the uterus closed. The uterine muscle seemed softer than usual and deeper in color, and it bled scarcely at all. Twenty-four hours after operation, the patient was transfused because of her poor condition. Improvement followed, and she was allowed to go home on the twenty-second day. Twenty days after leaving the hospital she returned with an attack of erythema nodosum, from which she recovered.

Wing's second case was also a primipara in about the eighth month of pregnancy. Fifteen hours before admission to the hospital she began to have slight labor pains. Seven hours before admission bleeding from vagina occurred. A physician who was called, packed the vagina with iodoform gauze, and referred her to the hospital some hours later.

On admission her general condition was good. Fetal heart, 140. The uterus was very firm, and remained more or less tonically contracted. Cervix thick and barely admitted a finger tip. No placenta felt. The uterus was tender. It was noted that the head, which was above the brim, moved laterally when the uterine contractions occurred, in the direction of the left iliac fossa. Wing, on watching this patient, explained this peculiar lateral movement of the child by some cord entanglement, and that the bleeding was due to a partial separation of the placenta. Wing decided upon a Cesarean section, and he found the cord twice around the neck, and its insertion in the placenta was almost marginal and at the lower border. The child was born alive and did well.

Wing's explanation of this accidental hemorrhage is that the short cord pulled off a portion of the placenta. A diagram of the condition found accompanies the report.

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INDUSTRIAL HEALTH INSURANCE.

THE subject of industrial health insurance, now interesting a considerable proportion of the medical and legislative community, is novel to most persons in this country, but is far from being a new social phenomenon. It was established in England before the outbreak of the European War; in Germany as early as 1883; and in Russia rudimentary attempts in the same direction were made in 1806 to protect the health welfare of industrial workers. The appearance of the problem, therefore, in our own community is to be looked upon as an inevitable evolutionary step. The compensation of working men for injuries received in the pursuit of their occupation has already been established in this country, though many of the details of its administration are not as yet satisfactorily adjusted; and experience has shown in other countries, that where once the policy of neglecting disease or leaving its care to private interests has been abandoned, a complete series of social health legislative measures has ultimately been adopted. Viewed in the historical perspective, therefore, it appears now that the problem of industrial health insurance and other forms of medico-social legislation should be met by the medical profession in a spirit of friendly criticism, recognizing their intrinsic justice and desirability, and endeavoring to profit by the experiments of others in securing such conditions and details of administration as shall make such acts equitable and beneficial to all.

In last week's issue of the JOURNAL we published the text of the Doten Bill, a measure of industrial health insurance introduced before the Massachusetts General Court at its latest session, and now under consideration by the recess legislative committee. Closely similar bills have been introduced into the legislatures of about twenty other states. In the same issue we published an expository editorial, aiming to point out in brief the leading propositions of this bill and their relation to the medical profession. This publication was in no sense intended as an endorsement of the Doten Bill. While recognizing the desirable principle of industrial health insurance, we doubt that this bill, or any other bill hitherto drafted, would satisfactorily secure the benefits of this principle for the community. The present purpose of the JOURNAL is to foster and encourage frank and open discussion of the entire problem, and to this end it has planned to devote its issue of December 21 to a symposium of articles, dealing with various aspects of the subject from several points of view. In subsequent issues its columns will be freely opened as heretofore, to contributions and discussions, presenting different standpoints and opinions. The question is many-sided, and it is only by its temperate and careful discussion, in a spirit of amity and genuine interest for the common welfare, that the best solution can be profitably attained.

SHOCK AND LOW BLOOD PRESSURE.

IN a remarkably graphic and lucid article, published in another column of this issue of the JOURNAL, Dr. W. T. Porter of Boston records the interesting results of his personal investigations last summer into the subject of shock, as observed at the front and in hospitals immediately behind the fighting line in Europe. His vivid narrative not merely presents accurately

the conditions under which he sought to determine the genesis of shock, but illustrates admirably the fact, not often made obvious in medical papers, of the romantic interest attaching to scientific research when its object has so direct a bearing on clinical medicine.

The outstanding fact resulting from Dr. Porter's observations in France, correlated with his previous experimental study of shock in laboratory animals, is that shock is essentially a vaso-motor phenomenon associated with a persistent lowering of the diastolic blood pressure to 50 millimeters or less. The possibility of recovery from shock is dependent upon the possibility of restoring this pressure to within normal limits. The patient suffering from this condition, unrelieved, dies essentially of splanchnic, or intra-portal, hemorrhage.

Dr. Porter points out not only these facts, and the causes by which the condition of shock is induced under the circumstances of warfare, but also the remedies by which it may be successfully combated. These are, briefly: posture, warmth, intravenous infusions of normal saline solution and of adrenalin, and blood transfusion. Individually, these methods have doubtless been known and practised by many surgeons. It seems hardly likely, however, that they have been consistently practised in sequence in the treatment of surgical shock as seen under the circumstances of civil practice, where, of course, the physiologic and pathologic phenomena of shock are the same as in warfare, though the etiology may differ. The two important facts of Dr. Porter's paper are its clear presentation of the genesis, nature and rationale of treatment of shock, and its exemplification of the possibilities of valuable service of scientific methods in elucidating the problems of clinical medicine and pointing out the way for their solution.

PROGRESS OF POLIOMYELITIS.

During the past week there has been a slight recrudescence of poliomyelitis in Massachusetts. One new case was reported on December 9, making a total of 18 cases during the first 9 days of the month. The numbers of cases during the preceding months in Massachusetts were: July, 107; August, 252; September, 623; October, 702; November, 179.

Report from St. Paul, Minn., on December 1, states that Dr. E. C. Rosenow, working at the Mayo Clinic with Dr. E. B. Towne of Boston, and Dr. G. W. Wheeler of New York, has isolated a polymorphous streptococcus from the tonsils and pharynges of over fifty patients in the acute stage of poliomyelitis; and that with cultures of the larger forms of this organism, the disease was consistently reproduced in susceptible animals. The authors are reported as saying of these observations: "The exact relation of our results to the facts already established as to the etiology of poliomyelitis cannot yet be definitely stated. It appears to us that the small filtered organism which has been generally accepted as the cause of poliomyelitis, may be the form which this streptococcus tends to take under anaerobic conditions in the central nervous system and in suitable culture media, while the larger and more typically streptococcic forms, which investigators have considered contaminations, may be the identical organism grown larger under suitable conditions."

Report from Washington, D.C., on December 2 states that a resolution has been drafted for immediate presentation to Congress, calling for an appropriation of $250,000 to be expended by the United States Public Health Service on an intensive study of poliomyelitis. The weekly report of the Service for November 24 records a general decline of the disease throughout the United States. During the month of October the largest numbers of cases outside of Massachusetts were: 254 in New Jersey, 250 in Pennsylvania, 238 in New York exclusive of New York City, 148 in Minnesota, 143 in Illinois, 120 in Maryland and 84 in Wisconsin.

Apart from continued research into the etiology and transmission of the infection, the most important problem now connected with the epidemic of poliomyelitis is the after-care of convalescents from the disease. In previous issues of the Journal we have noted the beginning already made in Boston in the special clinic established at the Children's Hospital. Similar work is being done at the Massachusetts General Hospital, and at other large clinical centers in the State. In New York, where exists the largest group of these patients demanding attention, the problem is in the hands of a committee on the after-care of infantile paralysis, which was organized as the result of a series of conferences, called by Dr. Haven Emerson. It

is not desirable that after patients are dismissed from quarantine, they should pass out of the jurisdiction of the health department. The following description of the organization and work of the committee is quoted from the weekly bulletin of the New York Health Department as a valuable outline of the method adopted in dealing with the after-care of poliomyelitis in that city:

"The committee has undertaken three main lines of work: first, to coördinate the work of the dispensaries and nursing agencies, so that no child should want or wait for treatment; second, to organize dispensary transportation for all the children who needed it; and, third, to raise funds to aid in the treatment, home care and training of these children.

"To accomplish the first of these, the committee divided the entire city among the following four home-visiting agencies: the Committee on Crippled Children of the Brooklyn Bureau of Charities, the Henry Street Settlement, the Association for the Aid of Crippled Children, and the Bureau of Educational Nursing of the New York Association for Improving the Condition of the Poor. To November 16, 5409 children had been referred to these agencies, and largely through their efforts 3288 of these were reported as being then under treatment, either with private physicians or in the dispensaries. In addition to these, 86 cases have been referred to the social service department of the New York Hospital, where the patients had been as acute cases; 85 of these are reported as having begun treatment. Among those reported as under treatment is a small number who have no residuary paralysis, but are being examined occasionally so that no deformity may unexpectedly develop. The visiting nursing agencies also do the dispensary social service work where it is not otherwise provided.

"While the city was easily divided among the nursing agencies, it has been difficult to divide it among the dispensaries. Many things had to be considered,—equipment, personnel, location, local need, transportation, preference of parents, etc. As a matter of fact, most of the patients are being cared for by about twenty dispensaries, while half of that number are doing most of the work. The committee is still trying to group the cases about the best dispensaries and into districts convenient for transportation.

"To accomplish the second of these purposes, the committee secured and operated a small number of ambulance busses and motors, on its own account and through the coöperation of the Sick Children's Transfer Society, the Social Service Department of Bellevue Hospital, the Forward Fund and the Militia of Mercy. The Board of Estimate and Apportionment has made a small appropriation to the Department of Charities to provide transportation to and from the dispensaries, where necessary, and it is hoped that eventually the transportation will be fully provided by the city. In the mean time, the committee will continue its service and will doubtless find it necessary to supplement the city's transportation in special cases.

The agencies upon which the burden of after-care fell did not hesitate for lack of funds to begin work. But it was soon found that they must have additional funds. Either they must raise them through separate appeals, or the Committee on After-Care must raise money for them. While this question was pending, the Public Health Committee of the Academy of Medicine and the Associated Out-Patient Clinics recommended that the Committee on After-Care take this opportunity to promote the best standards of equipment and personnel in the dispensaries engaged in after-care. Accordingly, a budget was prepared, and a large citizens' finance committee was appointed to raise money for the treatment, home care and training of these children. The committee is asking for a quarter of a million dollars, which, however, will not care for them till they are recovered, but will carry the work into, if not through, the second year. None of this money will be used for the administrative work of the committee—this cost having been met by the Rockefeller Foundation—but will be used only for after-care, first of all through established needful and satisfactory agencies, and second, to encourage new ones where the children of a locality cannot be conveniently treated otherwise. At the request of the Commissioner of Health, the Committee on After-Care will administer the brace fund, raised by the Department of Health as a result of public appeals.

"The Committee on After-Care consists of a general committee, representing the Department of Health, the Department of Public Charities, the hospitals, dispensaries, nursing associations, and other welfare agencies; a Committee on Transportation, comprising more than a hundred names; a Medical Council of twenty-one orthopedists, neurologists and pediatrists; and a Finance Committee of two hundred men and women."

HEALTH AND SANITATION IN THE NAVY.

THE recently published annual report of the secretary of the United States Navy records the work of that national department for the fiscal year ended June 30, 1916, but includes operations and recommendations to December 1 of this year. Particular attention is directed to the section of the report dealing with health and sanitation in the navy, to which an especial medical interest attaches. In this section it is

pointed out with how much care the personal health and welfare of young men in the navy is safeguarded. As a matter of fact, during the past year the death rate of the naval personnel was only 4.48 per thousand, whereas the death rate of men in the same age period, exposed to the ordinary hazards of civilian life, was 8 per thousand.

"Incident to the nature of a seafaring life is, of course, the constant menace of drowning, and of our total deaths, 51, or one-sixth, are due to this cause. Of these, however, 21 are those who went down with the *F-4*.

"It is noteworthy that the three predominant causes of death—drowning, tuberculosis, and pneumonia—all show, upon analysis, encouraging improvement over preceding years. Tuberculosis, also, as it is handled in the navy, is found less frequently in naval than civilian life. To quote statistics again, our civil population between the ages of 15 and 60 years owes 30% of its total deaths to this disease; naval mortality during 1915 owes 11% of its deaths to this cause, and this is being materially bettered each year.

"The activities of the medical department of the navy during the past year have been unusually marked. Naval and military developments of this unprecedented epoch of military history are constantly being observed, and proper use made thereof in the plans and activities of our own service. Our medical officers detailed for observation purposes with the warring powers are informing themselves of all facts available pertinent to the medico-military aspects of naval life."

After a brief discussion of the medical activities of the navy in Haiti and Santo Domingo during the past few years, the report emphasizes, as follows, the indispensable importance of the hospital ship and the nature of the personnel of enlistments in the navy:

"The usefulness of a hospital ship as a necessity in modern warfare has been emphasized by the European conflict; and the naval act of this year, besides increasing the Medical Corps from 347 officers and 1500 men to 600 officers and 3000 men, besides facilitating advancement in the Hospital Corps from the lowest enlisted rating to that of actual commissioned officer, and besides increasing the total appropriation for the medical department from $682,000 last year to $1,187,728 for the current year, has led the navies of the world in authorizing the construction of a model hospital ship, which will be a veritable *Bellevue* afloat. The war across the Atlantic has demonstrated the value of the hospital ship. The British alone employed over 40 ships of this class during the Gallipoli campaign. These ships and the ships employed by other nations, however, were designed for other purposes, and hastily converted to meet the emergency. The new hospital ship being constructed by the Philadelphia navy yard will be an oil-burner, with all that this means for comfort and cleanliness. A stabilizer will make for steadiness afloat. Not only will she provide hospital accommodations for the sick of the fleet, but experience of a number of years with the *Solace* has shown the necessity of making provision for an out-patient department, wherein men of the fleet may receive special treatments and examinations, returning to their ships on the same day.

"The navy is also to be congratulated upon the consistently maintained standards that are giving us a personnel which is the pick of the ambitious youth of our nation. During the past year 106,392 sought enlistment in the navy. Of these, only 30.18% were accepted. During the last four years, owing to a full or relatively full complement, the large number of applicants, and consequent ability to make more careful selection, the percentage of acceptances has decreased from an average for the previous six years of 52.67 to 30.18. The present rigidity of physical requirements not only insures a fine standard of men, but helps to lighten the pension load of the country in future years. The urgent need of more men, as would happen in time of war, could be met by a modification of the standards without entailing the acceptance of any deficient types."

Finally, the report describes the advances that have been made in the medical education of candidates for the navy hospital corps. In 1914 two training schools for hospital corps men were established,—one at Newport, R. I., and one at San Francisco. Successful schools have also been established at Samoa and Guam for training native women as nurses.

"Homes for nurses at Mare Island and Boston have been furnished, and provision has been made on the coast lines south of Norfolk and Mare Island, which are as yet unprovided with navy hospitals, for the calling into being of mobile Red Cross hospitals of 250 beds each, with complete personnel and equipment. To prepare the Medical Reserve Corps, a correspondence school has been initiated for the purpose of training these officers. The higher standards, the zeal and sacrifices of the men in this corps, and their devotion to health and sanitation, cannot be too highly commended.

"Authority has been given by Congress for ample reserve stock, medical and surgical supplies, which is recognized as essential in a comprehensive plan of being ready for emergencies."

MASSACHUSETTS CONFERENCE ON FEEBLE-MINDEDNESS.

In last week's issue of the Journal we noted the annual conference of the Massachusetts Society for Mental Hygiene, which is being held during the present week at Ford Hall, Boston. The entire conference this year is devoted to the subject of feeble-mindedness, and an admirable program, of which a portion was published last week, has been arranged. At the initial meeting, on the evening of December 13, Dr. Walter E. Fernald, superintendent of the Massachusetts School for the Feeble-minded, at Waverley, discussed the present practicabilities in the way of protection, education, supervision and segregation of the feeble-minded, pointing out our present lack of adequate facilities for this purpose.

"Many feeble-minded persons eventually become permanent public charges. Many run the gantlet of the police, the courts, the penal institutions, the almshouses, the tramp shelters, the lying-in hospitals, and often many private societies and agencies, perhaps, eventually, to turn up in the institutions for the feeble-minded. At any given time, it is a matter of chance as to what state or local or private organization or institution is being perplexed by the problem they present. They are shifted from one organization or institution to another as soon as possible. At present there is no bureau or officer with the knowledge and the authority to advise and compel proper care and protection for this numerous and dangerous class."

The afternoon meeting of Thursday, December 14, will be devoted to a discussion of the problems associated with feeble-mindedness and illegitimacy, and the evening session of that day to a symposium on types of delinquent careers, and feeblemindedness regarded from its legal aspects and in reformatories. On Friday afternoon, December 15, will be discussed methods of caring for the different groups of feeble-minded subjects, and on Friday evening there will be a final meeting with papers, among which will be one by Dr. Robert M. Yerkes on the diagnosis of children needing special care, and one by Prof. William H. Burnham of Clark University on pseudo-feeblemindeness.

The problems of feeble-mindedness, like many others of those with which the present generation has particularly undertaken to deal, are as yet far from complete or satisfactory solution. It is only by coöperative interest in conferences such as the present that ultimate progress may be expected.

PETER BENT BRIGHAM HOSPITAL.

The recently published second annual report of the Peter Bent Brigham Hospital covers the activities of that institution for the year ended Dec. 31, 1915. During this time there have been admitted into the wards of the hospital 3417 patients and there have been 8536 new patients treated in the out-door department. The x-ray department made 4572 examinations and there have been over 2229 examinations made in the serologic laboratory and 750 studies in the respiration laboratory. The total operating expenses for the year have been $269,913.46 and the receipts from patients have amounted to $88,651.55.

In the report issued by the Hospital of its first year's work, attention was drawn to the utter lack of uniformity in the statistical tables of surgical cases and operations as they are presented by the various hospitals of the country which make any pretense at all of tabulating the results of their surgical work. Unquestionably their value would be increased if the hospitals of a given community would agree upon a uniform system of tabulation. To this end the report of the surgical department contains the following statement of progress toward this result. "A committee on hospital organization had already been established by the Massachusetts Medical Society, and in conjunction with representatives of the major hospitals a meeting of this committee was held at which an agreement was reached and a subcommittee appointed. This sub-committee has held several meetings, and it is hoped that eventually some uniformity in nomenclature as well as in the system of tabulations may be agreed upon. The so-called 'International Classification,' though compiled merely for the purpose of registration of mortality statistics, has been utilized by many institutions, chiefly with the Bellevue modifications and rearrangements, as a means of recording morbidity statistics as well. Unsatisfactory as this classification is for clinical purposes, it has nevertheless seemed best to continue to build upon this foundation, until some more acceptable method is devised, in the hope that more hospitals will meanwhile become accustomed to the use of the title numbers."

MEDICAL NOTES.

NEW YORK DIAGNOSTIC SOCIETY.—Report from New York on November 30 announces the organization in that city, of the New York Diagnostic Society, consisting of about three hundred physicians and surgeons, with the following officers: Dr. M. Joseph Mandelbaum, president; Dr. Dewitt Stetton, first vice-president; Dr. Otto Hensel, second vice-president; Dr. Julius Auerbach, treasurer; Dr. Monroe Kunstler, secretary. This Society has already raised a fund of $100,000 and when this sum is doubled it purposes to build, establish and maintain a diagnostic hospital, with a staff of experts by whom diagnoses will be made and patients referred either to a specialist or to the general practitioner by whom they were first sent to the Hospital.

PREVALENCE OF DISEASE IN THE UNITED STATES.—The weekly report of the United States Public Health Service for November 24, 1916, states that during the month of October there were eleven cases of cerebro-spinal meningitis in Massachusetts, forty-one of malaria in New Jersey, and three hundred and sixty-seven of typhoid fever in Maryland.

CHOLERA IN TURKEY.—It is reported that Asiatic cholera became epidemic in Turkey in June, 1916. From that time until the middle of September there were 9009 cases of the disease with 4651 deaths.

EUROPEAN WAR NOTES.

REPORT OF BELGIAN RELIEF FUND.—The recently published third annual report of the New England Belgian Relief Fund contains the following statement by Mr. John S. Codman, manager of the local relief fund.

"Our fund was organized in October, 1914. The Belgians were the first war sufferers, and, as they had at the beginning the undivided sympathy of the New England public, the contributions came in very rapidly during the first three months of the fund's existence. Later, as was to be expected, after the first burst of enthusiasm and when the needs of other peoples began to claim attention, the contributions fell off despite the ever-increasing need.

"During the early months of the war there were also large contributions of food.

"In January, 1915, the cash receipts were swelled by a sale of a large consignment of potatoes contributed from Maine and sold for cash, and in February $16,000 was received as the proceeds of the Belgian Kermesse. During the spring and summer of 1915 receipts were very small, but on Nov. 17, 1915, a second general appeal was sent out for funds to purchase clothing for the coming winter, and the receipts for November jumped from $2300 at the close of business on Nov. 17 to $31,300 at the end of the month. In 1916, the spring again showed a falling off, but in the summer, as the result of persistent advertising, the receipts, compared with corresponding months of the previous year, were greatly increased with little additional expense. These receipts are not really attributable to those months, but should be spread over a number of months.

"In the autumn of 1915, a great effort was made to meet the urgent call for clothing needed for the winter in the conquered part of Belgium, and $60,000 was spent for this purpose in the three months of October, November and December.

"The total purchases (mostly clothing) for the year Oct. 1, 1915, to Sept. 30, 1916, amounted to $121,411.34.

"In addition to the above spent for relief in the conquered part of Belgium, $10,000 was forwarded to the Rockefeller Foundation to help the work of removing children from the war zone in Flanders to Switzerland, there to be cared for and educated.

"The sales force has been utilized for much clerical work in connection with letter appeals for funds, and these appeals have brought in at headquarters over $7000 cash contributions at a very small percentage of expense. Still other cash contributions, amounting to nearly $9000, have been received at headquarters.

"The books of the fund have been audited by Harvey S. Chase & Co., covering all transactions up to May 1, 1916, and their report shows total contributions and interest on same $366,211.72, total spent for relief $332,433.87, and $11,834.13 cash on hand, indicating a total administrative expense of $21,943.72, or only six cents out of every dollar contributed.

"Through the kindness of Montgomery and Stone and other well-known theatrical stars, a very enjoyable performance was given for the benefit of our fund in the Colonial Theatre on Jan. 28, 1916.

"On April 26, 1916, a band concert was given for our fund in Symphony Hall by the Cercle Musical Instrumental of the Union Belge, Inc., Modeste Alloo conducting. The band was assisted by Mlle. Renée Longy, Mr. Georges Longy, Mr. De Mailly and Mr. Orphée Langevin.

"Our fund coöperated with other local relief organizations in the Massachusetts booth of the Allied Bazaar in New York last June. From this the net proceeds to our local Belgian fund amounted to approximately $500, but as one-third of the net proceeds of the Allied Bazaar itself went to the Commission for Relief in Belgium, our efforts in behalf of Belgium are represented by a sum considerably larger."

An earnest appeal for continued support is made to the public by the executive committee of the Belgian Relief Fund.

Red Cross Relief in Serbia.—Report from Washington on November 29, states that the Austro-Hungarian government has requested the American Red Cross to discontinue on December 1 its relief work in Belgrade and northern Serbia. As a matter of fact, this work had practically come to a standstill since the beginning of the Roumanian invasion, for the supplies distributed by the Red Cross in northern Serbia were largely procured from Roumania.

"Nearly $75,000 has been contributed to that section from this country, while 100 carloads of supplies from Roumanian relief committees and eighty from Swiss committees have been distributed by the American agents. Edward Stuart, assisted by Charles Fox, has cared for about 36,000 people in Belgrade and Dr. Edward Ryan has endeavored to reach about 100,000 in the interior.

"American relief in southern Serbia now is thrown into greater importance by Austria's request and especially by the advance of the Allied armies about Monastir. Reports from that city say 200,000 people are in distress, as the retreating armies of the Central Powers are said to have stripped the city bare of food and supplies. Shipments are being prepared for that section."

American Red Cross War Relief.—In a recent letter from Miss Ethel W. Putney, Secretary of the American Red Cross Committee at Cairo, Egypt, which has, for some time past, been supplying food and clothing and affording medical attention to some 4,000 or more Armenian refugees living in a "tent city" on the outskirts of Port Said, Egypt, a request is made for $16,000 for the continuance of this work during the next year. The Red Cross and the American Committee for Armenian and Syrian Relief have joined in providing the amount requested.

"Individual gifts," says Miss Putney, "have practically ceased. Therefore we come to you for the whole sum of our next year's budget. We shall greatly appreciate if you will cable us your decision at your earliest opportunity. You will readily see that our plans for the winter which is shortly upon us depend upon your granting this budget."

Among the refugees are 700 cases of pellagra, and in order to meet the special diet requirements of these patients, a considerable increase of expense is necessary. The Committee has established a system of hot baths in the camp, which is giving great satisfaction and is of material assistance in maintaining the health of the refugees.

The camp is largely self-sustaining through a system of industries which permits a great many of the inmates to be kept steadily employed on productive labor. For instance, about 200 women are making crochet work, while a great many of the refugees are employed at manufacturing army shirts, of which about 1,000 are turned out every week. These are sold to the British Army at good prices.

Through its agents in Saloniki, the American Red Cross is preparing to undertake the relief of a large number of distressed civilians in southern Serbia, particularly in and about Monastir, just as soon as it is possible to enter that section behind the lines of the Serbian Army. The Red Cross agents have cabled an estimate that 200,000 civilians occupy the section of country just wrested from the Bulgarian forces by the Allied troops, and that a very large percentage of this population is in need of assistance. Because of rough roads and the lack of railway facilities the agents suggest that food supplies be sent in small cases which may be carried on pack trains. The Red Cross is also requested to send three two-ton trucks for the transportation of supplies.

A first shipment of food supplies, purchased at a cost of $5,000, will leave New York within a day or two, and $5,000 additional have been cabled to the agents at Saloniki for emergency purchases. As the situation develops, large additional shipments of supplies will follow and it is probable that the Red Cross staff in Saloniki will be increased.

War Relief Funds.—On Dec. 9 the totals of the principal New England relief funds for the European War reached the following amounts:

Belgian Fund	$192,934.54
French Wounded Fund	163,516.81
Armenian Fund	128,721.98
French Orphanage Fund	71,241.31
British Imperial Fund	70,322.31
Polish Fund	52,374.26
Permanent Blind Fund	39,835.94
Italian Fund	28,233.04
LaFayette Fund	21,079.03
Wittenberg Prisoners' Fund	2,013.65

BOSTON AND NEW ENGLAND.

Week's Death Rate in Boston.—During the week ending Saturday noon, the number of deaths reported was 209, against 249 for the same period last year, with a rate of 14.33, against 17.35 last year. There were 28 deaths under one year of age, against 41 last year, and 64 deaths over 60 years of age, against 90 last year.

The number of cases of principal reportable diseases were: diphtheria, 36; scarlet fever, 20; measles, 8; whooping cough, 4; typhoid fever, 9; tuberculosis, 46.

Included in the above were the following cases of non-residents: diphtheria, 6; scarlet fever, 4; tuberculosis, 7; smallpox, 1.

Total deaths from these diseases were: diphtheria, 1; typhoid fever, 2; tuberculosis, 21.

Included in the above were the following deaths of non-residents: tuberculosis, 2.

HOSPITAL BEQUEST.—The will of the late Joseph Faulkner of Hamilton, Mass., which was recently filed for probate at Salem, Mass., contains a bequest of $5000 to the Lynn Hospital, to be known as the Faulkner Fund, the income to be used for the general purposes of the Hospital.

Massachusetts Medical Society.

WORKMEN'S SICKNESS INSURANCE AND THE DOCTOR.

WORKMEN'S SICKNESS INSURANCE, whether in the form of the Doten bill or in other guise, is largely a medical question. If a bill providing for it should be passed without more care than was evidenced in the passage of the present Accident Compensation Law in this State, it seems probable not only that medical care of the injured workman would be poor, but that the whole practice of medicine in the Commonwealth would be disrupted; for the law seems likely to include in its provisions, *families* as well as *actual wage-earners* within a $1200 limit.

Our profession has a record for altruism, but to ask us to sacrifice ourselves to a plan which we are not sure of as a benefit even to our patients would be absurd!

The undersigned—a committee appointed by the Council of the Massachusetts Medical Society, in June, 1916, to look after the interests of the profession in this matter—have given a good deal of study to the question, and have tried to profit by the work previously done by others. Also, we have kept in touch with the Recess Committee of the Legislature, designated to consider this among other questions for report to the coming legislative session.

It has seemed to us timely to present to the profession a draft of provisions that represent what we may call the irreducible minimum of medical rights. In the drafts for bills, and in the bills introduced for such legislation to date, the medical side has been strangely neglected.

We understand that the proponents of the Doten Bill have now in preparation changes and amendments to meet this neglect. Nevertheless, though hoping that others may protect our interests or rights, we feel it the duty of medical men to protect themselves.

The draft herewith submitted is put before the medical profession of the State for consideration and discussion. It should not be given out as representing the opinion of the profession until we have more expression of opinion.

There seems to be some divergence of view in the profession as to the value of the main principle involved. This is natural. Your committee may well be wrong in this, but we have felt that it was not within our province to pass on this very large question; we have felt that it was for us only to detail the conditions necessary, *in case such a bill should pass the Legislature*, in order that the workingman should be cared for, and cared for properly, without utterly ruining the doctor.

We believe, by the way, that ruining the doctor *would often kill or spoil the workingman*.

The draft herewith presented seems to us to represent the minimum demands we *must* make if the proposed legislation is to go through. *More unfavorable conditions must result in inferior medical service*, and so work to the defeat of the intent of such legislation.

The working man will necessarily hesitate in his adherence to a scheme that does not take proper care of him. The doctor is far within the edge of his rights, if he wants to know where he comes in.

SECTION 1. *Medical, Surgical and Nursing Attendance.* All necessary medical, surgical and nursing attendance and treatment shall be furnished by the carrier from the first day of sickness, during the continuance of sickness, but not to exceed twenty-six (26) weeks of disability in any consecutive twelve (12) months. In case the carrier is unable to furnish the benefit provided for in this section, it must pay the cost of such services actually rendered by competent persons at a rate approved by the Commission. Competent physicians and surgeons shall mean those upon the panel, as provided for in Section 2. By the rate approved by the Commission shall be meant the rate established in Section 4. By furnished (lines 3 and 6) shall be meant furnished as provided in Section 2.

SECTION 2. *Medical and Surgical Service.* On or before ....., every physician and surgeon who, being legally qualified to practise in Massachusetts, shall desire to serve under this act, shall register for this purpose with the Commission, and each carrier shall be, within a reasonable time after such date, furnished by the Commission with a list of physicians and surgeons so registered. From this panel, so constituted, the carriers may indicate to their insured a preference, but the patients shall have free choice among the physicians or surgeons upon this panel, subject to the physician's or surgeon's right to refuse service on grounds specified in regulations made under this act by the Commission, provided, however, that no physician or surgeon on the panel shall have on his list of insured patients more than 500 insured families or more than 2000 insured individuals. The Commission shall, upon presentation of satisfactory evidence that any physician or surgeon upon the panel is incompetent, neglectful of his duty, or dishonest, suspend or remove such physician or surgeon from the panel, and decision of the Commission shall be final.

SECTION 3. *Appointment of Physicians and*

Surgeons as Referees. The Commission shall establish Districts and shall appoint a physician or surgeon as referee in each District; such referee shall be paid by the Commission a salary not to be less than $ per annum and shall devote his entire time to the work. It shall be the duty of such referee to supervise the character of the medical and surgical service in the interest of the insured patient, the physician, the carrier and the Commission. He shall decide all disputes involving medical or surgical questions that arise between insured patients and physicians, between physicians serving upon the panel, between insured patients and carriers, or carriers and physicians, including the termination of disability. His decision may be appealed from to the medical advisory board, whose recommendation shall be given to the Commission, whose findings shall be final.

SECTION 4. *Payment of Physicians and Surgeons.* Physicians and surgeons, serving upon the panel, shall be paid by the carriers for medical or surgical services rendered to the insured a fee per visit that shall be not less than the average minimum fee for services rendered by physicians and surgeons of the locality in similar cases. Services rendered in maternity cases shall include previous supervision, when applied for, for at least six (6) weeks previous to the delivery, and supervision for four (4) weeks after birth, included as a part of the care of childbirth.

In case of dispute between physicians and carriers as to charges for services, the Commission shall have the power to decide, and their decision shall be final.

SECTION 5. *Medical and Surgical Supplies.* Insured persons shall be supplied by the carrier with all necessary medicines, surgical supplies, dressings, eye glasses, trusses, crutches and similar appliances prescribed by the physician, not to exceed in cost for any one insured person the amount of $ in any one year.

SECTION 6. *Hospital Treatment.* Hospital or sanatorium treatment and maintenance shall be furnished upon the approval of the medical officer of the carrier instead of all other benefits, except as provided for in Section , with the consent of the insured member or that of his family, when it is not practicable to obtain his consent. The carrier may demand that such treatment and maintenance be accepted when required by the contagious nature of the disease, or when in the opinion of its medical referee, such hospital treatment is imperative for the proper treatment of the disease or for the proper control of the patient. Cash benefit may be discontinued during refusal to submit to hospital treatment. Hospital treatment shall be furnished for the same period as cash benefit. This benefit may be provided in those hospitals and sanitaria with which the carriers have made satisfactory financial arrangements, provided that such hospitals are of a standard approved by the medical advisory committee. A charge of $15.00 per week shall be considered a proper charge per patient for hospitals and sanitaria.

SECTION 7. *Maternity Benefits.* Maternity benefits shall consist of all necessary medical, surgical and obstetric aid, materials and appliances which shall be given insured women and wives of insured men. A weekly maternity benefit payable to insured women equal to the regular sick benefit of the insured for a period of ten (10) weeks, of which at least six (6) shall be before delivery, shall be made on condition that the beneficiary abstain from gainful employment during the period of payment.

SECTION 8. From a list of twenty (20) physicians or surgeons recommended by the Massachusetts Medical Society and the Massachusetts Homeopathic Medical Society, each in proportion to its total membership, the Governor shall appoint a Medical Advisory Committee of five members to serve respectively five, four, three, two years and one year. Vacancies on this board from death or resignation shall be filled for the unexpired term. Each succeeding appointment, except for the filling of such vacancies, shall be for five years. The members of this Committee shall be paid only for actual expenses incurred in the performance of their duties. It shall be the duty of this Committee: (1) to advise the Commission on medical matters; (2) to standardize contracts with hospitals and dispensaries; (3) to hear and act on all disputes arising, including such as are referred to them on appeal as provided in Section 3. Their findings shall be transmitted to the Commission for approval and adoption.

It is recommended that, owing to the medical questions involved in the proposed act, the act be so drawn that there shall be medical representation upon the Commission.

F. J. COTTON,
W. H. MERRILL,
F. W. ANTHONY.

Miscellany.

SOCIETY NOTICES.

THE BOSTON CITY HOSPITAL.—The Boston City Hospital Medical Meeting, to be held in the Surgical Amphitheatre, Thursday, Dec. 14, at 8.15 o'clock, P.M., will discuss "The Laboratory and Clinical Aspects of Acute and Chronic Nephritis." "Pathology," Dr. F. B. Mallory; "Clinical Aspects," Dr. Henry Jackson; "Renal Efficiency," Dr. J. P. O'Hare.

Physicians and medical students are invited to attend. Hospital telephone, B.B. 7400.

THE NORFOLK DISTRICT MEDICAL SOCIETY.— A regular meeting of the Society will be held in the Surgical Amphitheatre, Boston City Hospital, Tuesday evening, Dec. 19, at 8 o'clock sharp. Telephone, B.B. 7400.

Business:

Communication: A Symposium on Infantile Paralysis. "Pathology," F. B. Mallory, M.D.; "Clinical Aspects," E. H. Place, M.D.; "After-treatment," J. J. Thomas, M.D. Dr. Place will give a ward visit from 4.30 to 5.30 P.M.

BRADFORD KENT, M.D., *Secretary.*

NEW ENGLAND PEDIATRIC SOCIETY.—The forty-fifth meeting of the New England Pediatric Society will be held in the Boston Medical Library, Friday, Dec. 29, at 8.15 P.M.

I. Report of Council and nomination of officers.

II. The following papers will be read:

1. Case report, Wyman Whittemore, M.D., Boston; 2. "Some Observations with Sour Milk Feeding," C. K. Johnson, M.D., Burlington, Vt.; 3. "Difficulties in the Diagnosis of Diseases of the Hip-joint." A. T. Legg, M.D., Boston; 4. "Should All Milk be Pasteurized?" Richard S. Eustis, M.D., Boston.

III. Election of officers.

Light refreshments will be served after the meeting.

A. C. EASTMAN, M.D., *President.*
RICHARD M. SMITH, M.D., *Secretary.*

HARVEY SOCIETY.—The fourth lecture in the current series before the Harvey Society will be delivered at the New York Academy of Medicine on Saturday evening, December 16, by Prof. Henry H. Donaldson of the Wistar Institute of Anatomy and Biology, on "Growth Changes in the Mammalian Nervous System."

MASSACHUSETTS MEDICAL SOCIETY.

SPECIAL MEETING OF THE COUNCIL.

There will be a special meeting of the Council in Sprague Hall, Boston Medical Library, Wednesday, Dec. 20, 1916, at 11 o'clock, A.M., to consider the proposed legislation by the Massachusetts General Court on Industrial Health Insurance. The attention of Councilors is directed to the "Doten Bill," the full text of which may be found in the BOSTON MEDICAL AND SURGICAL JOURNAL of Dec. 7, 1916, under "Miscellany." A special number of the JOURNAL, devoted to Social Insurance, will be issued on Tuesday, Dec. 19, instead of on Thursday, Dec. 21, the regular date of issue.

WALTER L. BURRAGE, M.D., *Secretary.*
Boston, Dec. 13, 1916.

HARVARD UNIVERSITY MEDICAL SCHOOL.

HARVARD MEDICAL MEETINGS.

First Meeting Friday Evening, Dec. 15, 8 P.M.
A Amphitheatre.

A series of meetings is being arranged by the Harvard Medical School at which each department will, in turn, give an account of the departmental activities, both in research and in teaching. In this way it is hoped that members of the teaching staff, graduates and friends of the School may be kept fully informed of what is going on.

The first meeting will be held on Friday evening, Dec. 15, at 8 P.M., in the amphitheatre in Building A. The Department of Pathology will have charge of the meeting. The following addresses will be made:

Dr. Wolbach: "General Survey of the Department of Pathology and Methods of Teaching," "Studies in Rocky Mountain Spotted Fever."

Dr. Wright: "Recent Work on Blood Forming Organs—Normal and Pathological."

Dr. Mallory: "The Value of Hospital Laboratories to Teaching and Research with Examples Illustrated by Lantern Slides."

Light refreshments will be served in the Faculty Room after the meeting.

EDWARD H. BRADFORD, M.D., *Dean.*

APPOINTMENTS.

UNIVERSITY OF ALABAMA.—Dr. Joseph M. Thüringer has been appointed professor of anatomy, and Dr. Claude W. Mitchell, professor of physiology and pharmacology in the University of Alabama Medical School.

UNIVERSITY OF ILLINOIS.—Dr. L. V. Heilbrum has been appointed instructor in microscopic anatomy at the University of Illinois Medical School.

RECENT DEATHS.

DR. GEORGE DOUGLASS RAMSAY, who died at Newport, R. I., on November 27, was born in New York City in 1869. He was a surgeon major in the United States Volunteer Army during the Spanish American War and a member of the United States Medical Reserve Corps.

DR. FRANCIS JOSEPH KEANY died at his home in Boston, November 23. The son of Matthew Keany, a prominent North End politician and property owner, he was born in Boston, March 1, 1866, was educated in the public schools and in Boston College, from which he was graduated in 1889. After graduating from the Harvard Medical School in 1892, he spent a year at the Rotunda Hospital in Dublin, and three years in Vienna, studying dermatology. He was dermatologist to the Carney Hospital and to the Boston City Hospital, and consulting dermatologist to St. Elizabeth's Hospital, and had served as a trustee of the City Hospital since 1897. He held the position of professor of dermatology to Tufts College Medical School. He held membership in the Massachusetts Medical Society, the Boston Athletic Association, and the Clover Club. His widow and three children survive him.

DR. J. PICOT, who died in France on September 26, 1916, was born in the department of Meurthe-et-Moselle in 1839. He obtained his medical degree from the University of Strassbourg and in 1872 was appointed deputy professor of medicine at Tours. In 1877 he was awarded the Montyon prize by the Institute of France for his work on clinical pathology. In 1878 he was appointed professor of pathology at the University of Bordeaux, and in 1879 professor of clinical medicine. He was elected a corresponding member of the French Institute in 1891, and in 1899 received the cross of the Legion of Honor. He was one of the founders of the Gazette Hebdomadaire des Sciences Médicales de Bordeaux.

DR. HARRY PRINGLE ROBINSON, a Fellow of the Massachusetts Medical Society, died at his home in Amesbury, Nov. 28, following an operation for appendicitis. He was a graduate of Harvard Medical School in the class of 1902, and was 40 years old. He is survived by his widow.

DR. WALTER S. SUTTON, who died in Kansas City on November 10, was professor of surgery at the University of Kansas. He was best known to biologists for his discovery of the mechanism of Mendelian inheritance in germ cells.

DR. JOHN EDWIN WALKER, who died on November 22, at Thomaston, Maine, was born in Union, Me., on Feb. 23, 1858. He received the degree of A.B. in 1881 and that of M.D. in 1884 from Bowdoin University. He had practised his profession in Thomaston since 1884, and for over twenty-five years had been physician to the Maine State Prison in that city. He was a member of the American Academy of Medicine, the American Medical Association, the Maine Medical Association, the Maine Academy of Medicine and Science, and the Knox County Medical Society.